Lake Erie College of Osteopathic Medicine’s independent study pathway program: an alternative medical school curriculum design

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Lake Erie College of Osteopathic Medicine has developed an independent study pathway as an alternative to the traditional medical school curriculum design. Beginning with the 2001-2002 academic year, three equivalent and distinct curriculum pathways will be available to medical students at the Lake Erie College of Osteopathic Medicine: the lecture/discussion pathway, the problem-based learning pathway, and the independent study pathway (ISP).

The ISP program will provide flexibility for students during their preclinical years. Using highly structured faculty-developed modules, students in the ISP program will be responsible for their own learning in a self-directed, independent manner, including when, where, what, and how to study. Examinations will be taken when students consider themselves ready. If examinations reveal deficiencies in student preparation, these deficiencies must be remedied before students continue their studies. Faculty will be available, as needed, to assist the students through difficult concepts and material.

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In July 1999, the Lake Erie College of Osteopathic Medicine (LECOM) submitted a proposal to the American Osteopathic Association Council on Pre-doctoral Education requesting a “substantive change” regarding the medical education curriculum. The request recommended that LECOM be permitted to develop and implement two new curriculum pathways by which medical students could earn the Doctor of Osteopathic Medicine (DO) degree: the problem-based learning pathway (PBLP) and the independent study pathway (ISP). These new pathways are equivalent to, but distinct from, the existing lecture/discussion pathway (LDP). After considering the request, the Council gave its approval.

Using a 1-year period to plan, develop, pilot, and refine plans, LECOM initiated the PBLP program, slated to begin in the 2000-2001 academic year. The college is following a similar 1-year process and time frame for formal initiation of the ISP program, set to begin in the 2001-2002 academic year.

The concept of an independent study pathway as an alternative to the more traditional lecture/discussion pathway is not new to medical education. The Ohio State University College of Medicine introduced an independent study pathway in 1970; the University of Wisconsin Medical School did so in 1972.1,2 The Ohio State initiative continues to the present and has been shown to be as effective as the lecture/discussion pathway in preparing medical students as physicians.3 LECOM has chosen to use Ohio State’s ISP program as a model on which to base its planning and development work. This article describes the current perspective guiding the planning process during this development period.

Overview of the ISP
The ISP program will provide more flexibility for students during their preclinical years of study at LECOM. Students will use sets of highly structured objectives, resource guides, and computer-based materials to read, review, and learn on their own. They will proceed at a self-determined pace through subject modules, within program-defined limits. All students will take an examination on the material of each module when they consider themselves ready. If the examination identifies deficiencies in student learning, students will need to remedy the situation before continuing to the next module. Faculty will be available, as needed, to assist the students through difficult concepts and material. The ISP program will cover the first 2 years of coursework normally offered in a traditional curriculum, but will do so in a time-independent manner. Implemented as learning in a minimally structured environment, the ISP program at LECOM is expected to stimulate students to become lifelong, self-directed learners.

Advantages and disadvantages of the ISP
In instituting an independent study pathway at LECOM, curriculum planners recognize that such an alternative pathway through the basic sciences will offer advantages to students but also will concurrently have associated disadvantages.4 Both in planning the program and in counseling students about its availability, these advantages and disadvantages must be clearly communicated.
**Advantages**
The following are advantages of the ISP:

- Reinforces skills needed throughout a medical career, for example, self-directed learning, independent learning, and time management.
- Involves students in an active versus passive learning process.
- Self-paced; more time can be devoted to difficult topics or for which the student desires greater depth of knowledge, with less time spent on material already understood.
- Modules allow faculty to recommend greater variety in study materials: texts, journal articles, audiovisuals, computer-based courseware, Internet resources, etc.
- Less stressful; flexibility (when, where, what, and how to study) allows students to build confidence in their mastery of material before proceeding.
- Provides students the opportunity for approved leaves of absence (research, special experiences, extended illness, familial problems, etc) without penalty.

**Disadvantages**
The following are disadvantages to the ISP:

- Not well suited for students who cannot manage time effectively.
- Compulsive students may move too slowly, putting off examinations until they believe they have learned everything.
- Extra patience and focused guidance required of students as they adjust to the new learning structure and learn how to better budget their time, take accurate and precise notes, outline information, and use learning objectives to guide their study.

**ISP program structure**
The program structure required to develop and offer an independent study pathway differs little from that required of a lecture/discussion pathway or a problem-based learning pathway. The basic elements within each pathway are essentially the same; however, the unique structure of each pathway requires a different manner of addressing those elements. The specific manner of approach-

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**Checklist**

### YEAR 1
- **Core Curriculum Modules**
  - Biochemistry
  - Histology/cell biology
  - Microbiology/immunology
  - Molecular biology/genetics
  - Pathology
  - Pharmacology
  - Physiology
  - Integumentary system
  - Musculoskeletal system
  - Neurosensory system

- **Traditional Setting and Approach**
  - Anatomy
  - Embryology
  - Healthcare management I
  - Medical ethics
  - Microbiology laboratory
  - Osteopathic Preceptor Education Project
  - Osteopathic principles and practices
  - Physical examination
  - Spirituality in medicine

### YEAR 2
- **Systems Curriculum Modules**
  - Cardiovascular system
  - Respiratory system
  - Renal system
  - Hematology/oncology
  - Digestive system
  - Endocrine system
  - Reproductive system
  - Pediatrics
  - Infectious diseases
  - Psychiatry

- **Traditional Setting and Approach**
  - Advanced cardiac life support
  - Clinical Osteopathic Diagnostic Applications
  - Geriatrics
  - Healthcare management II
  - Human sexuality
  - Medical jurisprudence
  - Osteopathic principles and practices
  - Physical examination
  - Public health

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![Figure. Independent study pathway curriculum. Systems modules begin in the second semester of the first year and continue throughout the second year.](Image)

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**Program administration**
Four committees will be formed to expedite operations of the ISP program. The ISP Executive Committee will oversee the operations of the ISP program and will have the authority to approve and enforce necessary policies and procedures. The ISP Curriculum Committee will consist of key faculty, representing all ISP module authors, who will be responsible for reviewing individual modules and coordinating the overall aspects of the independent study pathway curriculum. The ISP Student Selection Committee will make recommendations regarding student applicants to the program. The ISP Student Review Committee will review students’ progress through the pathway and make associated recommendations.

**Faculty responsibilities**
ISP faculty will:

- Prepare modules, including rationales, learning objectives, learning resources, and anything else deemed important for a particular module.
- Update modules annually on the basis of student evaluations generated on completion of modules, adding new material as necessary.
- Prepare module examination questions, including annual revisions based on test item analysis and student evaluations of the examinations.
- Be available to students, as appropriate, to respond to questions or concerns.
- Provide help for students who score less than the criterion score for passing a particular module.
- Review all modules to assure proper content coordination within the entire ISP program.

**Curriculum content**
The Figure shows the independent study pathway curriculum by year. For each topic listed, there will be a module. Selected curriculum components offered
to the ISP students will be identical to those offered to the LDP students and PBLP students. These identically structured curriculum elements are listed under "traditional setting and approach." While the content of these components will be identical and will be conducted in group settings, there will be noticeable differences. For example, the anatomy courses will be presented off- sequence from the LDP program during June and July and will be completed before the ISP students begin their study modules. As another example, osteopathic principles and practices will be presented to ISP students in the same manner as for the LDP students; however, it will be offered on different days of the week.

**Instructional processes**

Modules drive the independent study process; each module guides students in learning. Once fully developed, all modules will have a common format. The introduction will include a rationale regarding the importance of the topic to future physicians and how the module relates to other modules in the overall curriculum. This rationale will be followed by comments on specific learning resources for the module, suggested reviews of previously studied material, laboratories or other special sessions (required or optional) that complement the topic, and the nature and scope of faculty involvement to be expected. Learning objectives for each module will clearly describe material to be learned so that students do not pursue material not required unless they wish to do so. The learning resources portion of each module will list the materials available for students to use to master the learning objectives. Suggested learning resources can include books, journal articles, audiovisual materials, slides, and video materials. Module authors will be allowed and encouraged to offer their own perspective regarding the topic, for example, presenting material not readily available elsewhere or integrating material from several sources so that students will gain a unique interpretation from the faculty member’s perspective.

**Student responsibilities**

Students will be given time guidelines for the completion of each module and examinations of the ISP program. They will be allowed to proceed on a self-established pace within certain limits (max times). Module authors (faculty members) will be available to the students as resources, conduct individual tutorials as requested by the students, and voluntarily attend discussion sessions and clinical correlation conferences.

**Evaluation of students**

Module examinations will cover one to four modules and will be administered on an individual basis when students consider themselves adequately prepared. The examinations will last 2 to 3 hours and will be in an objective-response format. Some examinations will be accompanied by visuals that require other types of responses. Students who score below a criterion percentage on any module section will be required to remediate that portion with the module author within 2 weeks. Oral or written retesting will be administered by the module author to assure that the student has achieved the minimal acceptable level of knowledge for the topic in question. Following successful remediation, the original score will be raised to the preestablished, minimally acceptable score to pass.

At the end of the first year of study, each ISP student will be required to pass an oral exercise administered by a basic science faculty member (one of the module authors). This exercise will test for deficiencies in skills deemed important in the student’s development as a physician: the ability to communicate, the ability to organize an oral presentation, and the ability to reason. Also, each ISP student will be required to take a shelf test from the United States Medical Licensing Examination on the areas of cell biology, biochemistry, and physiology at the end of the first year. At the end of the second year of study, each student will be required to take the National Board of Osteopathic Examiners’ Comprehensive Osteopathic Medical Licensing Examination Level 1 test. Unless passed, students will not be allowed to enter third-year clinical rotations.

**Program evaluation**

Program evaluation will be accomplished in numerous ways using various processes. At the completion of each module, students will be asked to fill out a questionnaire to evaluate the module regarding content, construction, and examination. On an annual basis, the ISP Curriculum Committee will evaluate each module for currency and overall fit with the other modules in the curriculum. Students’ test results and progress through the modules will be monitored, assessed, and evaluated for trends that may indicate necessary modifications. As data permit, comparisons will be made of students across the three curricular tracks. At the least, it will be expected that no group of students will perform at a significantly lower level than any other group of students, regardless of curriculum track. Finally, students will be asked to complete a questionnaire at the end of their first year and at the end of their fourth year. This will give some measure of how they performed depending on the curriculum track they pursued. Questionnaires will be sent to intern directors and residency directors of the graduate programs where LECOM graduates pursue their specialty training. From the directors’ responses, it should be possible to discern any substantial differences in perceived competency of the graduates related to the track they were in as preclinical students.

**Comments**

The Lake Erie College of Osteopathic Medicine has developed an independent study pathway program. When implemented in the 2001-2002 academic year, three equivalent and distinct curriculum pathways will be available to medical students to pursue their medical degree: the LDP, the PBLP, and the ISP. The ISP program will allow students to study independently at their own pace. They will be required to study content normally presented in a lockstep manner in the first 2 years of the typical medical education...
curriculum. A major goal of the ISP program is to provide medical students with rigorous learning opportunities in a minimally structured environment, similar to the environment that they will face as competent, lifelong, self-directed learners.

References

