

Learning Over Time: A Literature Review and Case Study

W. David Carr, PhD, ATC • The University of Kansas

Robin L. Ploeger, EdD, ATC and Jan Drummond, EdD • The University of Tulsa

THE CONCEPT of Learning Over Time (LOT) has been in the lexicon of athletic training education for several years. To date, there is considerable confusion over the definition of the term and the manner in which the concept should be incorporated into an Athletic Training Education Program (ATEP). The purpose of this report is to (a) review the current peer-reviewed literature and definitions supported by the National Athletic Trainers' Association Education Council and the Commission on Accreditation of Athletic Training Education (CAATE) for a definition of LOT, and (b) present a case study of an approach to documentation of LOT, including an explanation of the manner in which the concept has been incorporated into an ATEP.

LOT must be documented to comply with CAATE standards. Many ATEP directors have misinterpreted this requirement to mean that every competency must be repeatedly evaluated throughout a student's progression through the program. Often, the same evaluation form used to initially assess a skill is the same form is used to evaluate LOT. In our opinion, this is not the intent of the LOT requirement. We have developed a systematic plan for documenting LOT that avoids repetitive evaluations of the same competencies. Our intent is to allow the student to demonstrate acquisition of general skills that incorporate many competencies, which establishes an overall holistic proficiency. A competency is a discrete cognitive or psychomotor skill, whereas proficiency represents a combination of those discrete skills. An example of a competency in knee evaluation might be the use of a goniometer to measure flexion angle, whereas proficiency combines the goniometer measurement with a more complete evaluation.

Literature Review

A key word literature review of "learning over time" and "allied health education" that was limited to peer-reviewed English language articles from four databases (CINAHL, MEDLINE, ERIC, and Health Source: Nursing/Academic Edition) yielded 49 references. Many of these addressed

related topics, such as teaching evaluation, student teaching, literacy programs, and illness/disease education programs. From the original list of references, we selected 12 sources that were directly related to Athletic Training.¹⁻¹² Only four of these articles made direct reference to LOT.¹⁻⁴ An additional three sources that were not peer-reviewed articles made direct reference to LOT.⁵⁻⁷

Feinman-Nesmer¹ addressed LOT in the context of professional teacher preparation, integration, and professional development. The perspective of teacher preparation is an interesting point of view to consider for athletic training educators. The education of an athletic training student involves the learning of knowledge and skills, integration into the profession, and professional development through continuing education. Feinman-Nesmer presents the idea of learning to teach over time, which suggests that athletic training education not only occurs while students are enrolled in an education program, but extends into their professional practice experiences. Thus, an important concept related to LOT is the integration of learning experiences.

Letus, Moessner, and Dooley² discussed LOT in the context of portfolio development to document learning that can not be documented through grades and exams. The authors did not define what was meant by LOT, but discussed how portfolios allow students to reflect upon their education over time and to determine what it means to them personally and professionally. For our definition of LOT, we incorporate the idea of reflection presented by these authors.

Kell and van Deursen³ used the term LOT in the context of learning preferences and self-directed learning of adult students. The authors discussed the idea of using an evidence-based curriculum to promote the development of problem-solving and critical thinking skills. Competent clinical practice requires the use of problem-solving skills and critical thinking, which gets to the core of what is meant by LOT in athletic training education.

Konin, Amato, and Brader⁴ addressed LOT as an extension of a previously proposed concept of mastery over time, a term used by co-author, Amato.⁵ The authors discussed the LOT concept as one in which a number of components work in unison to develop a critical pathway from the classroom to clinical application in the decision-making process. It was stated that the challenge to LOT is making a smooth transition from the classroom to actual clinical practice. It is the

sequential and progressive nature of LOT that helps form a definition.

The NATA-EC web site⁶ defines LOT as the documented continuous process of skill acquisition, progression, and student reflection. It refers to a systematic progression that is based upon multiple indicators of student success. This definition incorporates the concepts of progression and reflection, which we will consider further.

The term LOT did not appear in the 2001 JRC-AT Standards for Accreditation.⁷ It did appear in the Interpretations Manual, but was not defined. The more recent 2005 publication from the CAATE Standards for Accreditation⁸ makes three explicit references to LOT. The first reference within the Student Records section (G1.4) states that the program must document clinical competencies and proficiencies, including skill acquisition and LOT evaluations. The second reference within the Clinical Education section (J2) offers the following guideline: "Clinical experience must provide students with the opportunity to integrate cognitive, psychomotor skills/clinical proficiency, and affective competence." It continues by describing how these clinical experiences must allow for the development, synthesis, and demonstration of cognitive competency. The terms *integration* and *synthesis* help to define the LOT concept. The final reference to the term is within the Standards Glossary, which defines LOT as "Mastery of Skill." The glossary describes a logical pattern behind the process of LOT as "Initial formal instruction and evaluation of the skill, followed by sufficient time to practice the skill, followed by re-evaluation of the skill." This re-evaluation is the area of LOT that causes the most confusion for educators. Many attempt to use the same evaluation method for documentation of LOT as that used for the initial evaluation of a skill.

Case Study

Re-evaluation should not mean having the student complete the same evaluation that followed the initial instruction. A new approach to re-evaluation is needed to incorporate the LOT-related concepts identified in the literature: progression, synthesis, integration, reflection, and critical thinking. When a student is asked to evaluate an injury/illness and propose a treatment program, the student is being asked to integrate and synthesize information. To do this, the student must reflect upon previous experiences and employ critical

thinking. The key challenge for the educator is development of a mechanism to document LOT that has the flexibility to apply to each different situation. We worked very closely with our clinical athletic training staff to develop a system that encompasses the required components and is applicable in the day-to-day clinical setting. Regularly scheduled staff meetings were used to discuss every stage of development over the course of several months. Feedback was solicited from all members of our clinical staff, which was integrated into the final product.

Our LOT documentation system involves two main components: evaluation structure and evaluation forms. The evaluation structure involves the progression and integration of core course content as the student progresses through the curriculum. As a student completes each of the core courses (Prevention and Treatment, Assessment, Rehabilitation, Modalities, and Organization), he or she is required to integrate and synthesize the knowledge previously acquired and to apply it to a given situation. Each semester, another form is utilized to represent the course content that the student has completed. As the student evaluates a given injury/illness, he or she must integrate the information gathered from the various elements of the evaluation and synthesize the information to form a correct assessment. The student is evaluated on his or her ability to perform specific clinical skills with expertise, judgment, and knowledge. The student must be able to complete the evaluation in an efficient manner. For example, the student must determine which special tests need to be performed and which ones can be omitted. Upon forming an assessment, he or she must reflect upon the available treatment interventions and demonstrate critical thinking to properly select modalities, rehabilitation techniques, taping, or bracing for the given injury/illness.

A generic form has been developed for each of the five core courses in our curriculum. Each semester, a student receives a packet of evaluation forms that corresponds to his or her level of progression through the curriculum. As a student progresses through the curriculum, forms are added that correspond to the course content that has been completed. Senior students receive all five forms (injury evaluation, prevention and treatment, modalities, rehabilitation, and administration), whereas freshmen receive only one form (prevention and treatment). Each student is

required to document two incidents that demonstrate LOT per semester with an approved clinical instructor. An incident is an actual or simulated injury/illness that requires evaluation and care. Several simulated injury/illness scenarios have been developed by the staff to reduce variation among evaluators and to address a given level of student knowledge. Each scenario provides the opportunity for the student to apply his or her knowledge to an actual or simulated event. Ideally, the student will be evaluated for LOT with an actual injury/illness encountered during the clinical experience, but the evaluation forms can be applied to simulations. Each evaluation form is based on the key components of the corresponding core course content. For example, the LOT evaluation form requires the student to conduct a complete evaluation (history, observation/inspection, palpation, functional tests, special/ligament tests, neurological status), reflect upon the important findings, display critical thinking and make an assessment (Table 1). Students are rated on the demonstration of clinical skill and efficiency for each component on a scale of 1 to 3. Skill is defined as the ability to perform the component task with expertise, judgment, and knowledge. Efficiency is defined as the ability to perform the component task without the expenditure of unnecessary effort. The 1 to 3 scale is defined as follows: (a) not proficient, needs work; (b) proficient, adequate; and (c) very proficient, excellent. To address different evaluation styles among the approved clinical instructors, we developed a rubric that clearly defines the 1 to 3 scale for each evaluation component (Table 2).

This documentation system has been employed in our curriculum for the past two years and is becoming more effective each semester. The completion of two LOT evaluations per semester is linked to the clinical experience and course content, but the score does not directly affect the course grade. The intent is to use this evaluation of clinical skills and knowledge as a tool to judge how much a student has progressed over time. Initially, we found that older students were resistant to the process, viewing it as yet another paperwork burden. Now, all students accept this system as a program requirement. In general, we have found that students use the feedback from these evaluations to focus on areas of deficiency and thereby improve performance on subsequent evaluations.

TABLE 1. EXAMPLE INJURY EVALUATION FORM

Injury Evaluation

Name _____ Date _____

Body Part being evaluated _____

Definitions:

Skill—ability to perform the component with expertise, judgment, and knowledge

Efficiency—ability to perform the component with a minimum of unnecessary effort

Scores:

1—not proficient, needs work

2—proficient, adequate

3—very proficient, excellent

Total

History

Skill	Efficiency
1 2 3	1 2 3

Comments:

Observation/Inspection

Skill	Efficiency
1 2 3	1 2 3

Comments:

Palpation

Skill	Efficiency
1 2 3	1 2 3

Comments:

Functional Tests

Skill	Efficiency
1 2 3	1 2 3

Comments:

Overall comments/suggestions:

ACI signature

Special/Ligamentous Tests

Skill	Efficiency
1 2 3	1 2 3

Comments:

Neurovascular

Skill	Efficiency
1 2 3	1 2 3

Comments:

Assessment – reports their findings to the patient

Skill	Efficiency
1 2 3	1 2 3

Comments Total ____/42

Average:

Student signature

TABLE 2. INJURY EVALUATION SCORING RUBRIC

History	
Skill (does it correctly)	Efficiency (efficient process)
1. Does not ask appropriate questions that correspond to (?)	1. Bounces around instead of following a logical format.
2. Only asks most basic questions.	2. Asks most basic questions in a logical order.
3. Expands upon basic questions to more advanced questions.	3. Asks appropriate questions and moves on from nonimportant areas.
Observation/ Inspection	
1. Does not make note of important signs or land marks.	1. No logical order – misses many important areas.
2. Notes all basic signs and landmarks.	2. Logical order to note all basic signs and landmarks.
3. Notes all basic signs and landmarks plus more advanced.	3. Notes all signs and landmarks in a logical order.
Palpation	
1. Identifies some important bony and soft tissue landmarks.	1. No logical order – misses many important landmarks.
2. Identifies bony and soft tissue landmarks with proper pressure.	2. Notes basic bony and soft tissue landmarks in logical order.
3. Identifies proper landmarks and notes potential problems.	3. Follows a logical order and notes all important landmarks.
Functional	
1. Improperly assess ROM, omits important areas.	1. No logical order, doesn't follow a sequence.
2. Correctly assesses all ROM.	2. Assess all ROM in logical order.
3. Correctly assess all ROM, demonstrates advanced knowledge.	3. Assesses ROM in logical order, displays advanced knowledge/abilities.
Special/Ligamentous Tests	
1. Does not correctly demonstrate tests, poor hand placement.	1. Does not follow any order and misses needed tests.
2. Correctly performs all needed special tests.	2. Follows a logical order and performs the needed tests.
3. Excellent demonstration of needed special tests.	3. Follows logical order and performs most appropriate tests.
Neurovascular	
1. Does not correctly demonstrate each area.	1. No logical order to assessment of each area.
2. Correctly demonstrates dermatome, myotome, and reflex.	2. Logical order to assessment of dermatomes, myotomes, reflexes.
3. Correctly demonstrates of correctly explains why neuro eval is not needed.	3. Logical demonstration or correctly explains why neuro eval is not needed.
Assessment	
1. Incorrect assessment.	1. Inefficient explanation.
2. Correctly identifies possible condition with minimal hesitation.	2. Efficiently states and describes condition to athlete.
3. Draws correct conclusion with no hesitation.	3. Clear and to the point, answers all questions.

Conclusion

From our literature review, we focused on the following LOT-related terms: *progression, synthesis, integration, reflection, and critical thinking*. Our definition of LOT is "The logical progression of skill and knowledge acquisition, synthesis, integration, and evaluation, which requires reflection and critical thinking." We hope that this definition will stimulate discussion about the LOT concept. We realize that our definition of LOT will not be universally accepted and that alternative definitions may be presented. Hopefully, a professional dialogue will ultimately produce a consensus definition of LOT that will provide ATEP directors with a better idea of how to approach its documentation. Our documentation system for LOT is flexible in its application, but it might not fit every program, and it certainly will not be compatible with every opinion of how LOT evaluation should be done. Our approach may provide a manageable starting point for many ATEPs. ■

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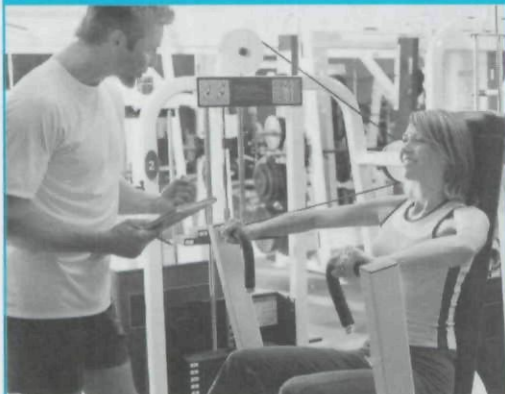
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W. David Carr is assistant professor and Athletic Training Program Director at The University of Kansas in Lawrence.

Robin L. Ploeger is clinical associate professor and Athletic Training Program Director at The University of Tulsa.

Jan Drummond is an associate professor at The University of Tulsa.

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