Implementation of the Diagnostic Pathfinder, an Internet-Based Tool to Teach Clinical Pathology in Diverse Educational Settings

Holly S. Bender  
_iowa State University_, hbender@iastate.edu

Karen M. Young  
_University of Wisconsin_

Jeanne W. George  
_University of California, Davis_

Mary M. Christopher  
_University of California, Davis_

Jared A. Danielson  
_iowa State University_, jadaniel@iastate.edu

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Abstract
Those of us who teach clinical pathology to veterinary students are continually exploring more effective ways to help students master the application of laboratory medicine to the solution of clinical problems. We not only must teach students the pathophysiologic basis of disease as applied to clinical laboratory data, but we also must instill a diagnostic reasoning process that is consistent and reliable. This reasoning process must be successful when applied to both common and uncommon diseases in multiple species, and also must be suitable for characterizing emerging diseases. Many of us have successfully used mechanism-based instruction to teach diagnostic reasoning, rather than presenting lists of facts and relying upon students to rote memorize.

Disciplines
Other Veterinary Medicine | Veterinary Pathology and Pathobiology

Comments

Authors
Holly S. Bender, Karen M. Young, Jeanne W. George, Mary M. Christopher, Jared A. Danielson, Pamela J. Vermeer, Eric M. Mills, R. Darren Wood, Paul D. Pion, Vanessa A. Preast, and Claire B. Andreasen

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Implementation of the Diagnostic Pathfinder, an Internet-Based Tool to Teach Clinical Pathology in Diverse Educational Settings

Holly S. Bender, DVM PhD Diplomate ACVP1,2; Karen M. Young, VMD PhD3; Jeanne W. George, DVM PhD Diplomate ACVP4; Mary M. Christopher, DVM PhD Diplomate ACVP4; Jared A. Danielson, PhD1,2; Pamela J. Vermeer, PhD1,2; Eric M. Mills, DVM, PhD1,2; R. Darren Wood, DVM, DVSc, Diplomate ACVP5; Paul D. Pion, DVM, Diplomate ACVIM6; Vanessa A. Preast, DVM1,2; Claire B. Andreasen, DVM PhD Diplomate ACVP2

1Biomedical Informatics Research Group, 2Iowa State University, 3University of Wisconsin, 4University of California–Davis, 5University of Guelph, 6Veterinary Information Network. The American Society of Veterinary Clinical Pathology is also a partner.

Introduction

Those of us who teach clinical pathology to veterinary students are continually exploring more effective ways to help students master the application of laboratory medicine to the solution of clinical problems. We not only must teach students the pathophysiologic basis of disease as applied to clinical laboratory data, but we also must instill a diagnostic reasoning process that is consistent and reliable. This reasoning process must be successful when applied to both common and uncommon diseases in multiple species, and also must be suitable for characterizing emerging diseases. Many of us have successfully used mechanism-based instruction to teach diagnostic reasoning, rather than presenting lists of facts and relying upon students to rote memorize.

Mechanism-based Instruction

In mechanism-based instruction, a solid foundation in normal physiology is emphasized before teaching students about disease. In addition, disease is explained as disruptions of normal physiology, and these disruptions are related to changes in clinical laboratory data. Mechanism-based instruction is especially effective for teaching diagnostic reasoning when integrated with clinical case analysis. Cases provide a real-world context for applying course material and for illustrating the various manifestations of disease mechanisms. Analyzing cases helps students understand 1) interconnections among different physiologic systems in the body, 2) how disease can disrupt these systems, and 3) how disruptions of normal physiology can result in characteristic cascades of effects that are reflected in laboratory data. Many students report that when disease mechanisms are learned from a case perspective, their understanding of pathophysiology is transformed from an unconnected list of facts into an integrated system of cause and effect. In addition, students report that studying pathophysiology to solve a case is much more motivating than studying to simply “pass a test.” In-class discussions of cases provide students the opportunity to engage in professional discourse as they present and defend their diagnostic reasoning. For a more detailed description of mechanism-based instruction using clinical cases at the Virginia-Maryland Regional College of Veterinary Medicine (VMRCVM) see Bender et al. Vet Clin Pathol 2000;29(3):77-83.
Two Challenges
While at the VMRCVM, Dr. Holly Bender was successful using clinical cases and a mechanism-based approach to teaching clinical pathology, however, despite her best efforts, two challenges persisted over the years. First, after reading a patient’s case history, some students abandoned any attempt to use the mechanism-based diagnostic reasoning process, ignored relevant data and jumped to an erroneous diagnosis. Second, students who did not analyze cases prior to in-class discussions subsequently learned little, and were left to copy and rote memorize the diagnostic reasoning process used by other students or the instructor. As a result of these two learning behaviors, these students consistently struggled with case analysis, demonstrated inadequate diagnostic skills, and performed poorly in the course. Dr. Bender concluded that the students' lack of success was due – at least in part – to limitations of the paper-based case analysis system, and that they might benefit from a computer program that would guide them through the diagnostic reasoning process, and reward them for analyzing cases prior to in-class discussion.

Dr. Bender established the Biomedical Informatics Research Group (BIRG) in 1996 to begin development on a novel Internet-based tool called the “Diagnostic Pathfinder.” During the design phase of development, Dr. Jared Danielson, a member of BIRG and an instructional designer, formally studied and documented the behavior of students as they analyzed cases in preparation for in-class discussion. His studies verified Dr. Bender’s original observations that students often jumped inappropriately to a diagnosis, and that their case analyses prior to in-class discussion were often incomplete. In addition, he identified a need for students to receive immediate feedback on their work upon completion of a case analysis. The Diagnostic Pathfinder software emerged from BIRG’s efforts to address these problems.

In 2000, Dr. Bender demonstrated an early version of the Diagnostic Pathfinder (at that time called the Problem List Generator) at the annual meeting of the American Society for Veterinary Clinical Pathology (ASVCP). Several clinical pathologists approached her afterwards to indicate that they too used a mechanism-based approach to clinical pathology instruction, and faced similar challenges. They saw great potential for using the Pathfinder in their own educational settings. Based on these early discussions, a concerted effort was made to obtain funding for further development of the Pathfinder, resulting in a $1.2 million award from the US Department of Education Fund for Improvement of Postsecondary Education (FIPSE), Learning Anytime/Anywhere Partnership (LAAP). The ASVCP and the authors of this report are partners in this grant.

The Diagnostic Pathfinder
The Diagnostic Pathfinder is an anytime/anywhere Internet-based case analysis tool that 1) supports the mechanism-based diagnostic reasoning process and documents its rationale, 2) guides students through the diagnostic process (prevents jumping ahead), 3) rewards students with course credit upon completion of their case analysis, and 4) provides immediate feedback so students can compare their diagnostic reasoning to that of an expert. The Pathfinder is a Java-based program that runs on the Windows and Macintosh platforms. Unlike many Internet-based programs that run through a browser,
the great majority of the time working through Pathfinder cases can be performed without an Internet connection. Students need only to connect briefly via a modem or Ethernet to submit cases. Most students prefer to install the Pathfinder on their own computers and work from home. A video demonstration of the Pathfinder is available at: http://www.birg.vetmed.iastate.edu/movie.html.

The Pathfinder consists of 6 major windows: 1) the Signalment/History/Physical Exam window that conveys background and initial information about a patient, 2) the Lab Data window that displays the results of laboratory tests, 3) the Construct Diagnostic Path window where students organize data abnormalities into groups and assign each a causal pathophysiological mechanism of disease, 4) the Make Diagnosis window, 5) the Expert Diagnostic Path window where students view their diagnostic rationale alongside that of the expert’s, and 6) the Submit for Credit window. The screenshots and associated text that follow show the process by which a student uses the Diagnostic Pathfinder and describe the purpose, student activity and relevant features of each window.

Case Selection
After logging on, the student selects the assigned case from a list of cases.

History, Signalment, and Physical Examination
Upon selecting a case, the student is presented with the patient's History, Signalment and Physical Examination findings.
Students extract relevant information from the history, signalment, and physical examination findings for use in case interpretation. Information can be recorded by highlighting pertinent words or phrases, and then clicking the “Record Observation” button. Alternatively, clicking the “Record Observation” button first will open an “Add Observation” dialog box in which students can type the relevant information. Selected observations appear in the Observations and Data Abnormalities column on the right (as shown in italics and indicated with an H).

**Lab Data**
After relevant findings have been identified and recorded, the student is presented with the Lab Data window. The Lab Data window helps students learn appropriate medical terminology and encourages them to pay attention to details by requiring that all abnormalities be identified, and by preventing them from ignoring any abnormal findings.
Students must first determine whether the result for each test is within reference values, and indicate so by making the correct choice on a pull-down menu. They then record the appropriate term for the abnormality in the corresponding box (e.g., anemia). Students cannot proceed to the next screen until all data abnormalities are correctly identified; help screens are available to assist the student when needed. Data abnormalities appear in the Observation and Data Abnormalities column in standard font, and are indicated with a D.

Construct Diagnostic Path
Once the student has correctly identified all data abnormalities he/she is presented with the Construct Diagnostic Path window that is split into the list of identified history and laboratory data abnormalities on the right and a drag-and-drop workspace on the left. The Construct Diagnostic Path window provides a powerful, flexible environment that supports the non-linear reasoning process needed to organize and interpret data. The Construct Diagnostic Path window requires that all observations and data abnormalities are used in the interpretation process, and provides a uniform format with which to communicate that process.
The student drags related history (H) and data (D) abnormalities from the Observations and Data Abnormalities list on the right into the drag and drop workspace on the left, and
groups them under causal pathophysiologic mechanisms (M). These mechanism/data groups are then further organized into a hierarchical indented outline that provides a visual representation of the student’s diagnostic reasoning. This outline is called a **diagnostic path**. Items above and to the left cause items below and to the right, or items below and to the right provide supporting evidence for items above and to the left. Groups of mechanisms and items are called item clusters. A data abnormality can be used as supporting evidence for multiple mechanisms. All components of the diagnostic path can be rearranged at will. Item clusters are expandable/contractible and can be selected with Shift-Click, Ctrl-Click, or lasso and dragged and dropped anywhere in the diagnostic path. A free text note can be linked to any item. This feature is often used to explain diagnostic reasoning in greater detail.

**Make Diagnosis**

Once the student has completed a diagnostic path and accounted for all data abnormalities at least once, the Make Diagnosis window becomes available.

![Image](image.png)

**Expert Diagnostic Path**

After entering a diagnosis, the student is allowed to proceed to the Expert Diagnostic Path window. The Expert Diagnostic Path window provides immediate feedback by displaying the student’s diagnostic path alongside the expert’s for comparison.
The student compares his or her diagnostic path to that of the expert to 1) reinforce correct assumptions, 2) identify misconceptions before they become ingrained, and 3) prepare for in-class case discussion. This window can also be used to display the experts’
notes concerning mechanisms or individual tests. Mechanisms in the expert list are color coded as core (green), review (blue), or framing (black) mechanisms. Core mechanisms are those that a case was specifically designed to illustrate and provide practice for. Review mechanisms have been taught and practiced prior to the case and are often key to its correct interpretation. Framing mechanisms are not central to the instructional objectives of the case, but provide meaningful context. Using an administrator function, the instructor can view the student’s diagnostic path as well. In this manner, the student and expert can actually see what the other was thinking.

Submit for Credit
Once the student views the expert list, the Submit for Credit window is made available.

The Submit for Credit window allows students to gain course credit for completing the homework assignment and self-assess to provide feedback to the instructor. Self-assessment allows the instructor to determine if certain students are struggling, or if certain topics are problematic for many students.

Implementation Reports

In a multi-year study at Virginia Tech, Danielson et al. (Educational Technology, Research, and Development, in press) found that students who used the Pathfinder to learn clinical pathology performed significantly better on a case-based final examination than students who learned in a similar course setting without the Pathfinder. Danielson et al. also found that both students and faculty felt that using the Pathfinder makes learning clinical pathology more effective. Since that time, the Pathfinder has been implemented at three additional veterinary schools or colleges (Iowa State University, University of Wisconsin–Madison, and University of California–Davis), using three different implementation strategies. As partners in the LAAP program, faculty members at these schools were asked to describe their experiences in a first-person narrative, to help convey the process they went through in implementing the Diagnostic Pathfinder in their curriculum. The partners were asked to consider the following questions:
What led you to adopt the Pathfinder for teaching? Were you addressing a specific problem in your course? Was this just a concept you believed in?

How did you use the Pathfinder? As a study/homework tool? to lecture? both? Did students use the Pathfinder in ways that you did not anticipate?

Did you notice benefits from using the Pathfinder? If so, what were those benefits?

Holly Bender DVM, PhD, Diplomate ACVP Iowa State University and Virginia Tech

“As mentioned previously, I consistently observed that students who struggled to acquire diagnostic reasoning skills often jumped to a diagnosis without considering all of the data and/or did not analyze cases prior to class. These behaviors were difficult to control and persisted from year to year because of the inherent limitations of using paper-based cases to teach diagnostic reasoning. I envisioned a computer-based solution that would guide students through the diagnostic reasoning process and provide course credit for analyzing cases prior to class. I knew that the solution to a problem of this magnitude was complex and would require a multidisciplinary team of professionals with diverse skills. Therefore, in 1996 I formed the Biomedical Informatics Research Group (BIRG), a team of experts in the fields of clinical pathology, instructional design and assessment, computer science, and veterinary informatics. BIRG’s work on the Diagnostic Pathfinder through 2001 is reported by Danielson et al. (Educational Technology, Research, and Development, in press).

Prior to implementing the Pathfinder, many of my students struggled for 7-10 weeks out of a 15-week semester before accepting that they should systematically analyze all of the laboratory data, construct a diagnostic rationale and then arrive at a diagnosis. Invariably, during the first part of each semester, student frustration was palpable. After implementation, the vast majority of students understood the diagnostic process within the first week or two of class, and avoided most of the frustration experienced by previous classes. In fact, after the Pathfinder was implemented, students exceeded my greatest expectations by how quickly they learned to think through a case, and how clearly they could articulate complex relationships among pathophysiologic mechanisms. Their improved learning over previous classes was further evidenced by a full letter grade increase in the mean final examination score.

In 2002, BIRG implemented the Pathfinder at two sites - Virginia Tech during the Spring semester and Iowa State during the Fall semester. Implementations at both sites were virtually identical except that 1) clinical pathology is taught in the second year of the veterinary curriculum at Virginia Tech, while in the third year at Iowa State, and 2) 89 students were enrolled in the Virginia Tech course, while 101 were enrolled at Iowa State. Both courses were designed around approximately 21 lectures, 49 case discussion periods and 21 unannounced quizzes. Lectures presented didactic material necessary for understanding cases, case discussion periods revolved around a series of 93 cases that grew in complexity and reinforced recurring themes, and quizzes rewarded regular preparation and discouraged “cramming.” Students used the Pathfinder as a homework tool to prepare for in-class case discussions and I used the Pathfinder as a case
presentation tool during those discussions. Thus, the Pathfinder allowed me to model and reinforce the diagnostic skills that I wanted students to practice during their homework in preparation for case discussions.

Each student was required to present a case to the entire class during one of the discussion periods. I met with each student presenter prior to class to review and revise their diagnostic path. This approach allowed students to see two expert diagnostic paths. The first was my diagnostic path provided by the Pathfinder, and the second was the diagnostic path presented by the student. I also prepared the student for questions that I planned to ask during the case presentation. These questions were designed to prompt them to address the important interrelationships among key pathophysiologic mechanisms of the case. Students report that this preparation allays pre-presentation jitters and boosts their confidence. During the presentation I used the Pathfinder to incrementally reveal the student’s diagnostic path as I asked probing questions. Even though I asked my questions in the style of a “devil’s advocate,” I used generous doses of gentle humor to lessen the tension for the presenting student. I always strived to maintain a safe atmosphere for learning that encouraged risk-taking and did not exact a high price for mistakes. Dependably, classmates asked many questions during case presentations and lively discussions resulted. Each student presenter acted as a catalyst for others to achieve similar levels of complex thinking. I believe that the combination of pre-class preparation and in-class interaction improved the learning experience for the class by 1) raising the quality of the presentations and 2) stimulating more in-depth and meaningful discussions.

The Pathfinder also provided me with a means for giving each student course credit for cases that were submitted prior to class discussion. The capability of granting credit for submitted cases resulted in nearly 100 percent compliance and dramatically improved class participation in case discussions. In previous years, participation by many students was limited to “heads-down” copying of diagnostic paths as they were presented. After introducing the Pathfinder, these discussions were transformed into meaningful exchanges about the more intricate subtleties of diagnostic reasoning.”

Karen Young VMD, PhD, The University of Wisconsin – Madison

“At the University of Wisconsin, the required 4-credit course in Veterinary Clinical Pathology taken by 2nd year veterinary students in the spring semester and comprising 45 hours of classroom instruction and 45 laboratory hours, has enjoyed much success if measured by student and peer reviews and teaching awards presented to faculty and instructors in the course. Mechanisms that underlie laboratory data abnormalities are emphasized, and students’ knowledge of mechanisms is tested via written examinations, case discussions, and laboratory exercises. Nevertheless, their ability to begin considering a comprehensive range of mechanisms that could explain an abnormality and not jump to conclusions, to make connections among mechanisms, and to use a diagnostic reasoning process, is limited. Mastery of the first steps in this process (identifying abnormalities and formulating hypotheses to explain them) is prerequisite to testing the hypothesis, or selecting additional laboratory tests to discriminate among the mechanisms that comprise the differential diagnosis.
When first exposed to the Diagnostic Pathfinder (Pathfinder), I appreciated it as an effective tool for promoting a student’s ability to identify mechanisms, select among them using supporting laboratory data, make connections among them, and work independently. After a 2002 pilot course with 6 students, I offered an elective to 2nd year veterinary students in 2003. The course, elected by 42 of the 74 students in the class, ran concurrently and was aligned by topic with the core course in clinical pathology. Students completed 3 cases/week for 15 weeks, submitting them electronically before class, and met once weekly with me to discuss central and confounding points. The requirements for this pass/fail elective were on-time submission of cases and attendance of class.

The students enjoyed the cases and discussions and were aware their efforts contributed to success in the core course. This was important to them, not only because they wanted to do well in the required course, but also because they recognized the importance of a firm foundation in clinical pathology to their careers in veterinary medicine. They learned the language of laboratory medicine, using terms correctly, demonstrated great breadth and depth in considering mechanisms, and asked thoughtful and insightful questions. Multiple students commented that the Pathfinder helped them tie information together and understand why laboratory abnormalities occurred in various diseases. It also helped them organize their thoughts. They attached great value to seeing the expert diagnostic path immediately after they had completed their own path. They recommended incorporation of the Pathfinder into the core course so all students could benefit. In summary, the Pathfinder is an effective tool to aid students in developing their diagnostic reasoning abilities.”

Mary Christopher DVM, PhD Diplomate ACVP and Jeanne George DVM, PhD, Diplomate ACVP University of California– Davis

“Our primary reason for adopting the Pathfinder was to explore a new way of helping students learn how to interpret laboratory data. In our veterinary curriculum, the clinical pathology course is an important fulcrum point at which students must shift from knowledge absorption and memorization to active reasoning and data interpretation, paving the way to effective problem solving in the clinic. It is challenging for students to learn this skill and make this transition. Our second reason for adopting the Diagnostic Pathfinder was to be part of a multi-institutional effort to develop and assess educational methods in veterinary medical education. We believe the Pathfinder has the potential to spark improvement and consistency in clinical pathology education nationwide.

We introduced the Pathfinder in stages. First, we informally used Pathfinder cases as paper cases within our usual course discussion format. We had just reorganized our core clinical pathology course, so were reluctant to make further changes to accommodate the Pathfinder at that time. Second, we used the Pathfinder as the core of a 2-week elective course for a small group of incoming 3rd year students (who had completed their core clinical pathology course). The students used the Diagnostic Pathfinder each afternoon in presentation mode for assigned cases they had worked on the night before. Student presentations formed the basis for discussion among faculty, residents, and students. The elective format gave instructors the opportunity to try the Diagnostic Pathfinder in a
small, low stress teaching environment. Third, we implemented the Pathfinder as an independent study tool in our core clinical pathology course. This large-scale use by 120 students complemented the course’s discussion sections. Instructors used the Diagnostic Pathfinder to monitor student progress and to prepare for instruction. Students were assigned 6 cases, and although use of the Pathfinder was voluntary, all but 1 student used the program.

Students primarily used the Diagnostic Pathfinder independently prior to class to review and to strengthen their understanding of material presented in lecture. Students also used Diagnostic Pathfinder cases during in-class discussion groups (4 students in each group). As the quarter progressed, students began to bring laptops to school so they could more easily access the cases. Students also used the Pathfinder to study for examinations; one student who did poorly on the midterm used the Diagnostic Pathfinder extensively and improved her grade. We were surprised at how differently students approached and organized the cases (indeed, the program made their different approaches very visible).

We used the Diagnostic Pathfinder in a relatively new (reorganized) course, so it was hard to make comparisons with previous years, but there were some differences. Students seemed more willing to try to interpret data on their own, taking a more active role in obtaining information, and solving and discussing cases – they did not rely as much on asking the instructors. Group discussions were much more lively and interactive (and noisy!) compared with the previous year, and more students were better prepared because they had used the Diagnostic Pathfinder the night before. The students especially liked the immediate feedback provided by the Diagnostic Pathfinder. Active learning, better preparation for class, and rapid feedback are benefits of the Pathfinder that we believe would generalize to other learning environments. The Diagnostic Pathfinder also improved the consistency of information given to the students and helped instructors see how lecture material may have confused them, and how to improve their teaching in that area next year. “

_Darren Wood DVM, DVSc, Diplomate ACVP University of Guelph (Planned Implementation)_

“My experience with the Diagnostic Pathfinder first began with Dr. Karen Young at the University of Wisconsin–Madison, where I was a clinical instructor from 2000-2002. Dr. Young was working with a pilot group at that time and I was able to sit in on some sessions and observe the program. I could readily see its benefit to student learning and when I relocated to the University of Guelph in 2002 I was afforded the opportunity to formally evaluate its usefulness within the new curriculum at the Ontario Veterinary College (OVC). Dr. Dale Smith of the University of Guelph was one of the original partners and has since handed the project over to me.

I am conducting a pilot study (Fall semester ’03) and am eagerly awaiting the outcome. I have a group of 5 students who will be using the Pathfinder as an additional learning tool during the initial part of their 3rd year Systems Pathology course. The curriculum at the OVC in Guelph is systems-based, with an emphasis on integration of course material. There is no separate course in clinical pathology. Instead, hematology and cytology are
taught in the 2nd year Principles of Disease course and clinical biochemistry relevant to
the system being studied is taught during the 3rd year. Overall, students feel they need
more experience with laboratory data interpretation. The Pathfinder should satisfy this
need, and I plan to use it as an additional after-class formative evaluation tool. It may
eventually be used in other parts of the curriculum as well.

Student Reactions to the Pathfinder

Student impressions of the Diagnostic Pathfinder are consistent with those reported by
faculty. After using the Pathfinder, students at each school were given a 28 item
questionnaire containing 22 10-point Likert-style statements and 6 open-ended questions.
All questions were aimed at determining whether or not the students felt the Pathfinder
helped them to learn and/or was easy to use. For the Likert items referred to in this report,
1 indicates strong disagreement, and 10 indicates strong agreement. Note that \( M \) refers to
the mean response for all students responding to that item, and \( n \) refers to the number of
students who responded to that item at each school.

Most students indicated that the Diagnostic Pathfinder was helpful for learning. For
example, most agreed with the statement, “Using the Diagnostic Pathfinder made
learning clinical pathology easier” (UW–Madison, \( M = 8.5, n = 41 \); UC–Davis, \( M = 6.9, n = 53 \);
Virginia Tech \( M=8.3 \ n=86 \); Iowa State, \( M = 8.2 \ n = 95 \)), and most also agreed
with the statement, “Using the Diagnostic Pathfinder helps me to organize my thoughts
about a case.” (UW–Madison, \( M = 8.3, n = 41 \); UC–Davis, \( M = 6.8, n = 53 \); Iowa State,
\( M = 8.0 \ n = 95 \); Virginia Tech \( M=8.4 \ n=86 \)).

Most students found the Diagnostic Pathfinder easy to use. For example, students
agreed with the statement, “Learning how to use the Diagnostic Pathfinder was
easy” (UW-Madison, \( M = 8.5, n = 41 \); UC, Davis, \( M = 7.6, n = 53 \); Virginia Tech
\( M=8.4 \ n=86 \); Iowa State, \( M = 8.7 \ n = 95 \)). In considering ease of use it is
important to note that students had the option of whether to use the Diagnostic
Pathfinder to complete their assigned cases, or to use a printed version of the
cases and construct their diagnostic paths on paper. In spite of this, and despite the
limited computer facilities for half of the participating students, students reported
using the Diagnostic Pathfinder to do nearly all of their assigned cases (95% of
the assigned cases at UW-Madison, 95% at UC, Davis, 95% at Virginia Tech, and
96% at ISU).

The fact that homework completed on the Diagnostic Pathfinder could be
immediately turned in online was universally popular with students. They
responded positively to the statement, “I like having my diagnostic paths turned in
automatically as soon as I finish them” (UW-Madison, \( M = 8.8, n = 41 \); UC,
Davis, \( M = 8.5, n = 53 \); Virginia Tech \( M=9.5, n=86 \); Iowa State, \( M = 9.6, n = 95 \)).
These data suggest that in spite of occasional technical problems, using the
Diagnostic Pathfinder was feasible for the majority of students, either on their
home computers, or in computer labs at their school.
Conclusion
The Diagnostic Pathfinder is a novel anytime/anywhere Internet-based case analysis tool that supports a mechanism-based diagnostic reasoning process, guides students methodically through the process, and rewards them with immediate feedback. Preliminary assessment of its implementation at four schools of veterinary medicine suggest that the Pathfinder can function in a variety of curricular settings ranging from full integration in a traditional lecture environment to independent study. These assessment results also suggest that students and faculty find the Diagnostic Pathfinder beneficial for both teaching and learning. As the LAAP partnership moves into its 3rd year, we look forward to completing a more comprehensive evaluation of the effectiveness of the Diagnostic Pathfinder for teaching veterinary clinical pathology. We also look forward to exploring additional and alternative ways of integrating the Diagnostic Pathfinder into veterinary professional and continuing educational endeavors.