

Teaching with

ALEKS[®]

for K-12 Education

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ALEKS Corporation

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1 The ALEKS Educational Paradigm

ALEKS is based on the realization that students learn math in different ways, at differing speeds. Starting from an accurate assessment of their current knowledge, students in **ALEKS** are only offered what they have shown themselves ready to learn. They therefore experience less frustration (from material that is too hard for them) and boredom (from material that is too easy for them). Learning is more efficient and more rapid. Students have “ownership” of their learning process, and grow in confidence and independence. If a student forgets what was once learned, **ALEKS** smoothly and efficiently guides the student through all necessary review and reinforcement. The student will not be “lost.” With time and persistence, every **ALEKS** student will progress toward mastery; this progress will be clearly visible to both student and teacher.

It is normal for students to be in disparate knowledge states; this would be the case in any event, but **ALEKS** puts this information clearly at the teacher’s disposal. The relative mastery attained by students appears clearly from the Class Progress page in the Teacher Module. **ALEKS** does not require the students to progress as a unified group. **ALEKS** will permit a student to work on any topic in the category “ready to learn,” a well-chosen list of topics which the student has not yet learned, but has demonstrated (within **ALEKS**) the readiness to begin learning.

Students using **ALEKS** will experience new independence in learning, to which some may be unaccustomed. Many will find this difference exhilarating. Teachers also may find different opportunities for optimizing their role in the learning process, with a greatly expanded ability to accurately monitor and effectively promote their students’ learning. The role of the teacher is critical in providing structure, support, and reward for the students’ effective use of **ALEKS**. If **ALEKS** is used properly, the teacher’s scope for individual coaching and small-group instruction will be greatly expanded, as will the freedom to teach a broader and richer math culture (to some or all students, time permitting).

In other words, **ALEKS** turns the teacher from a footsoldier in the trenches into a field commander, possessed of powerful resources, surveying a broad landscape of information, able to make effective strategic decisions. The point is that **ALEKS** puts the teacher in command; among other things, the teacher can take more or less of **ALEKS**, give it a greater or lesser position among other class requirements and activities. Various styles of use are possible. The following should be understood as mere suggestions, designed to give teachers a sense of the possibilities offered by **ALEKS**’s

substantial library of tools.

2 The Teacher and ALEKS

Not every way of using **ALEKS** involves supervised classroom sessions. When this is sensible, however, it provides a new dimension to the students' learning.

The teacher in an **ALEKS** class need not be collecting, correcting, or distributing papers, struggling with discipline issues, organizing groups, managing materials, giving instructions, or supervising activities. The teacher in an **ALEKS** class may be just as busy teaching mathematics to individual learners: getting one student started on a new topic, checking another student's work, responding to questions, suggesting alternate methods and explanations, making or reinforcing connections among concepts, congratulating those who "add an item to their pie." **ALEKS** provides comprehensive support to the student in every phase of its use; yet the teacher will find that the additional direct support given this way is unexpectedly welcome and productive. Suddenly the relation of teacher and student is based on knowledge and discovery, not management and sanction. No one is "behind" in **ALEKS**; setbacks are readily addressed and overcome; every student can expect to make progress and be recognized.

It is important, especially in the early stages of an **ALEKS** class, that the teacher be generous in recognizing student progress. Students need to understand that when they add an item to their pie, or show progress in a new assessment, it is an achievement, and the proper use of **ALEKS**. Soon this will become second nature and learning will be its own motivation. At the same time, formal rewards for the effective use of **ALEKS** need to be built into the class structure and made clear from the outset (See Sec. 3.).

Students will be assessed at the beginning of their use of **ALEKS** (following Registration and the Tutorial), and at regular intervals thereafter. The teacher does not need to supervise all **ALEKS** assessments; normally, students will be using **ALEKS** outside as well as in the lab or classroom, and taking assessments at various times and locations. Once the students realize that the purpose of the **ALEKS** assessment is to provide appropriate material in the Learning Mode, there will be little reason to get help, use the textbook or calculator inappropriately, or in any other way achieve incorrect assessment results.

We recommend that the initial assessment be supervised. The students

may need assistance in their first use of the system, they will need to be reassured that the assessment is not for a grade, and it is important that the results of this initial assessment be valid, so that that the students' work in the Learning Mode be productive from the start. For the teacher's own information, other supervised assessments may also be held at regular intervals to provide accurate "snapshots" of overall progress by the class (See Sec. 11). We suggest that such supervised assessments be scheduled at the midpoint and end of the class. Also, any assessment results which may be used as a component in the students' grades should, of course, be obtained from assessments performed with the level of supervision required by the educational institution for final exams (See Sec. 15).

NOTE. In cases where students do not seem to be making adequate progress in **ALEKS**, the cause may be found in help that the student received on an unsupervised assessment from a person or inappropriately used calculator, skewing the assessment results and leading to inappropriate material in the Learning Mode.

3 Planning the ALEKS Class

In some ways, planning a class in which **ALEKS** is to be used is simpler than planning other kinds of classes. The teacher may assume complete freedom in planning lectures, lessons, and assignments, while **ALEKS** ensures that students can progress toward mastery regardless of their level of preparation. It is neither necessary nor helpful for the teacher to attempt to constrain the interactions of the **ALEKS** system with individual students. To the extent that students will be working independently in **ALEKS**, the content of lab classes is provided by their work in **ALEKS**, and need not be planned separately. Teachers wishing to give their students the greatest possible benefit from using **ALEKS**, however, can use its features to plan focused small-group instruction from week to week (See Sec. 5).

At the same time, it is extremely important to make **ALEKS** an integral part of the class requirements and grading scheme. There is no other single factor which influences the success of students using **ALEKS** so much as the time that they spend on the system, along with the regularity of their use. This means that the students must be required to spend a suitable amount of time in **ALEKS** on a weekly basis, say 2-4 hours, that they must be informed of this at the very beginning of the class, and that the teacher must monitor their fulfillment of this obligation. Moreover, the amount of time required must be carefully determined to be reasonable, and in balance with

other requirements for the course. The teacher should not simply include an **ALEKS** requirement without reducing in corresponding measure the other requirements that the students would have had to fulfill without **ALEKS**. For example, the quantity of homework problems may be reduced, as the students will be solving problems in their **ALEKS** sessions. In a sense, the **ALEKS** requirement is stricter than others, since the teacher knows exactly what time the students have spent, and the students will naturally be sensitive to this. With time, students will realize the benefit that they receive from **ALEKS**, and its effect on their overall grades. At first, however, it will be simply another requirement, one whose communication requires particular thoughtfulness on the teacher's part.

Obviously these are only suggestions, and experienced teachers may well choose approaches that will be more effective with their own students. The underlying idea is that there must be clear, formal support for the use of **ALEKS**, however that support is best implemented in a particular setting.

Many teachers have found that in order for the **ALEKS** requirement to be meaningful, it may beneficially be made part of the grading system or system of rewards for the class. The simplest approach is to provide a certain number of points toward the final grade for each week that the student fulfills their required hours. It is advisable to reward each week, so that the student does not fall into the expectation that all of the required hours can be done at the end; consistency should be rewarded, along with total hours. If a student falls short of the specified hours during a particular week, that week is not rewarded, but neither is the "deficit" carried forward; the next week begins with a clean slate (the primary concern is regular use of the system; for this reason a surplus is also not carried forward). Proportional rewards are also possible; each hour spent has a point value, up to the required minimum.

In order to effectively monitor the students' use, the teacher should check the hours on the "Learning progress since latest assessment" page (under "Reporting"). This page can be printed out every week for record-keeping. In very rare cases, students will try to fool **ALEKS** by logging on to their accounts and doing something else; this can be detected by noticing that the number of items gained per hour is far too low (or null). **ALEKS** will log the student off if there is no activity after a certain amount of time. Teachers can obtain a precise record of a student's actual work in **ALEKS** by viewing the student's Report ("Reporting"/"Report for a single student in this class (pie chart)"), under "Learning Log."

The students' achievement in **ALEKS** (as opposed to their use of the system) may also be used as a component in their final grade. For information on how to do this please see Sec. 15.

4 Preparing Your Students

Computer Skills

Some students who have had little experience with computers may need assistance with the use of the mouse and, in particular, with “scrolling” the window of a web browser. We highly recommend that you demonstrate these skills to the students before beginning their use of **ALEKS**. If possible, additional staff should be on hand for the first session to assist the students as necessary.

Difficulty of Assessment Questions

The **ALEKS** assessment is always comprehensive in order to achieve the highest degree of accuracy and reliability. In the course of the assessment, some questions may be too easy or too difficult for some students. The students should be told to click the “I don’t know” button if a question is completely unfamiliar to them, but otherwise that they should do their best to answer. As the assessment proceeds, the questions will focus more and more closely on the outer limits of the student’s actual knowledge. In Learning Mode (following assessment), students will be provided only material that they are ideally prepared to learn.

Length of Assessments

The number of questions asked in an **ALEKS** assessment varies. Normally an assessment in Arithmetic requires between 15 and 25 questions. Occasionally, the number of questions asked may be greater than this.

No Help in Assessments

Explain to the students that they will need to use paper and pencil for answering assessment questions, but that no help or collaboration whatsoever is permitted during assessment. If the teacher or anyone else helps the student during assessment, even to the extent of explaining or rephrasing a question, assessment results may be inaccurate and the student’s learning in **ALEKS** may initially be hindered. Be sure they understand that the purpose of the initial assessment is to give **ALEKS** a precise, detailed understanding of what a student knows, so as to render learning very efficient by focusing on what the student is ready to learn. It is not a “test” that one can pass or fail. They will not receive a grade on an **ALEKS** assessment.

5 Focused Instruction with ALEKS

The features of the Teacher Module make it possible to prepare students for specific topics that they are going to work on, and to reinforce and expand on knowledge that students have recently acquired. This involves either guiding lectures or focused instruction to small groups of students based on data obtained from **ALEKS**. From the teacher's viewpoint, these are powerful features of **ALEKS**, and their use constitutes a proactive integration of **ALEKS** with the class structure.

The two kinds of “teaching opportunities” cued by **ALEKS** come from two types of information maintained by the system for students over the entire time that they use it: the set of items a student is “ready to learn” (or “outer fringe” of the student's knowledge state), and the set of items most recently learned (“what students can do,” the “highest” topics in the student's knowledge state, called the “inner fringe”) (See the *Teacher's Guide* under “Inner and Outer Fringes of a Knowledge State,” in the chapter “Knowledge Spaces and the Theory Behind **ALEKS**”). The items “ready to learn” are the topics a student may normally choose to work on in **ALEKS**; the items recently learned (“what a student can do”) are considered the least secure and most likely to need review or reinforcement. (These items may be made available for review by clicking “Review”; if a student has difficulty in the Learning Mode, this “inner fringe” will be substituted for the “outer fringe” or topics “ready to learn.”) When the students are logged on to **ALEKS** these two kinds of information are used automatically to guide and manage their learning. The teacher, however, can also view the inner and outer fringes in a convenient format to plan focused instruction that will parallel, supplement, and enhance the individual work that their students are doing in **ALEKS**.

To find this information for a class, the teacher should enter the Teacher Module and click “Reporting,” the name of the class, then “Average report (pie chart).” The piechart in Average report represents the average student in the given class, and displays the weaknesses and strengths of the class as a whole. To see the outer and inner fringes of the group we need to use options from the “Display mode” menu: “Ready to learn,” and “What students can do.”

Suppose we choose the option “Ready to learn (learning)” from the menu “Display Mode.” This will summarize the topics that all of the students in the class are currently ready to learn; the parenthesis “(learning)” indicates that the information is based on their most recent work in the Learning Mode, and so completely current. For each topic the number of students

ready to learn that topic appears to the right (e.g., “12 students”); clicking on that phrase displays the students’ names, whereas clicking on “Show All” displays all the students’ names for all of the topics. For each topic-list, there is a link to send a message to precisely those students. The purpose of this analysis is that the teacher may pick one or more topics from the list and schedule small-group sessions preparing the named students to learn them more effectively.

Now suppose we choose “What students can do (learning)” from the menu “Display Mode.” Another list of topics will be produced; the students listed for these topics, however, are those who have recently worked on and, at least tentatively, learned the topics. Thus, the teacher can schedule focused sessions with these groups of students to reinforce or expand on material that may be presumed fresh in the students’ minds, on which they are likely to have the most questions and ideas.

This gives the teacher the possibility of always teaching to students who are ideally prepared. It suggests a mode of teaching to the moment of opportunity, if you will (“kairotic” teaching, for fans of ancient Greek), and generalizes individual learning to small groups of learners at specific times; obviously, the data obtained for this purpose from **ALEKS** on one day will be of considerably less value if used a week later.

It may be useful to look at some examples illustrating how these features may be used. If you have not used the **ALEKS** Teacher Module extensively, don’t be troubled if some of this seems difficult. It will make more sense as you have more experience using **ALEKS** as a teaching tool.

Example 1: Basic

On a Friday evening, the teacher sits down to plan lessons for the following week. He or she logs onto **ALEKS**, selects the name of a class in Arithmetic, and clicks “Report.” A pie chart appears showing the average profile of mastery in the class. The “slice” of the pie chart for Whole Numbers is full to about 90 percent; the slices for Fractions, Decimals, and Proportions and Percents are filled much less, ranging between 20 and 40 percent. This indicates that lessons for the week may focus profitably on the most advanced Whole Numbers topics as well as on topics of moderate difficulty in Fractions, Decimals, and Proportions and Percents.

Example 2: Intermediate

On a weekend afternoon, the teacher logs on to **ALEKS**, clicks “Reporting,” then the name of a class in Arithmetic, and then “Average report (pie chart).” After a look at the pie chart, the teacher selects

“Ready to learn (learning)” from the “Display Mode” menu, and clicks “Graph.” When the list of topics appears, the teacher scans this list for items of particular difficulty. There it is! “Ordering Numbers with Exponents” has 16 students currently able to choose this topic from their pie charts. The teacher notes this topic down for class discussion early in the week. With the benefit of some timely preparation, the students can be expected to master this troublesome topic with little or no difficulty.

Example 3: Advanced

On a Monday morning, the teacher logs on to his or her **ALEKS** account, clicks “Reporting,” then the name of a class in Algebra 1, and then “Average report (pie chart).” Following this the teacher switches, first, to the option for “Ready to learn (learning)” and clicks the **ALEKS** Print button. Even if “Open All” was not clicked the page will be displayed with all lists of students’ names displayed. Then, the teacher switches to the option for “What students can do (learning),” and, again, clicks the Print button. With these two printouts in hand, the teacher is ready to begin planning. At this point, a great deal depends on the experience and expertise of the teacher, if the information is to be used to best advantage. Suppose that there is only time in the week’s schedule for two small-group sessions. (The **ALEKS** class has only one hour in the lab, and ten minutes are set aside to speak with each small group; the remaining 40 minutes are for helping students in the lab.) The teacher will look over the topics with two questions in mind: which topics have the greatest numbers of students, and which are pedagogically most worth discussing.

For example, looking at the list of topics “Ready to learn,” the teacher sees “Solving a Linear Equation with Absolute Value: Problem Type 1.” The teacher knows from experience that students have difficulty with the concept, and that they are more successful with it if they have had a chance to review. This topic has 12 students out of 30 in the class, so it has critical mass. The teacher uses the message feature to send a note to these students, asking them to meet in the front of the room at the beginning of the lab; the students will receive this note the next time they log on to **ALEKS**, no later than the beginning of that lab.

Looking over the list of topics “What students can do,” the teacher sees “Marking a point in the coordinate plane,” with 10 students. Although the number of students is less than for other topics, this one seems to the teacher richer in its content of mathematical culture than the others.

Students who have just worked on this topic are using the coordinate plane for the first time, and they are ripe for an introduction to the vast areas of mathematical thought for which it opens the door. Thus this is chosen as the second topic, and a second message is sent to these students, to meet at the front of the room, ten minutes into the lab.

6 Models of Classroom Integration

There are numerous ways in which **ALEKS** can be and is used in concrete educational situations.

1. **Supervised Math Lab.** Expert supervision can be provided for the students' use of **ALEKS** in regularly scheduled math lab periods, whether or not these are part of a conventional class structure. Students benefit from the direct coaching and assistance of qualified teachers in the course of their work with **ALEKS**.
2. **Math Lab in Structured Course.** The supervised math lab may be part of a structure of class meetings, combined with conventional and lecture-style classes. The teacher in such a setting need not gear the sequence of topics covered in classes in any way with what the students are doing in **ALEKS**; the students' independent work in **ALEKS** will increasingly benefit their performance on quizzes and tests, as well as their understanding of lectures, as the class progresses. **ALEKS** is not designed to "teach to the test," although experience has shown that students' performance on comprehensive tests improves dramatically when they have worked with **ALEKS** over time.
3. **Small-Group Instruction.** The recommended use of **ALEKS** in a classroom setting makes use of the detailed analysis of individual student knowledge provided through the Class Report page to tailor the lectures to the skills of students.
4. **Self-Paced Learning.** In this scenario students may use the school computer lab on their own, with only informal supervision. **ALEKS** is used in this case much as it is for distance learning, except that students have the opportunity for closer consultation with the instructor.
5. **Distance Learning.** **ALEKS** is used with great independence by students who may never enter the physical classroom, or may enter only on a few occasions for orientation and supervised assessments. **ALEKS** provides a range of features for communication between teacher and student, as well as powerful facilities for the monitoring and evaluation of student work.

Regardless of which approach is used, you can derive more benefit from **ALEKS** though monitoring the students' use of **ALEKS** and communicating with them, whether in direct contact, by email, or by messages through the **ALEKS** system. As discussed above, we recommend that a certain number of hours in **ALEKS** each week be required (See Sec. 2); this should be made clear from the start as part of the published course syllabus and rewarded appropriately through the grading scheme. Students' progress in **ALEKS** should be recognized and reinforced early on by informal, personal praise; conversely, students who do not seem to make adequate progress should be contacted promptly, the cause of their difficulty determined and remedied.

The following sections of this chapter provide more information on these issues affecting the classroom use and integration of **ALEKS**.

7 Monitoring Student Use

In the day-to-day use of **ALEKS** by a class, a principal concern of the teacher is to monitor that students are using the system with the required regularity and for at least the minimum required amount of time. The most convenient place to find this information is the "Learning progress since latest assessment page" (under "Reporting"). Each student's name is displayed on this page with the total number of hours that student has spent logged on to the system. Students can see this same total in their own accounts by using the button "Options."

It is also important that critical assessments throughout the class be supervised by the teacher, to ensure that valid results are received (See Sec. 2).

8 Monitoring the Progress of a Class

The teacher can also use the bar graphs to see how close each student is to mastery of the subject matter on the Class Progress page. It should be kept in mind that the bar graphs displayed on this page show only the students' achievement as of their last assessment (in blue) and any progress made in the Learning Mode since that assessment (in green). For a more panoramic view of the progress made by a group, select "Overall progress in assessment." This displays the difference between the students' knowledge as of their first assessment and that demonstrated on their most recent assessment.

To see each of the assessments for a given student, with that student's

progress subsequent to each assessment in the Learning Mode, the teacher should view the page “Progress report for a single student in this class” for the student.

9 Monitoring Individual Progress

On the page “Progress report for a single student in this class” there is a line for each assessment taken by a particular student, with bar graphs showing mastery as of that assessment and subsequent progress made in the Learning Mode. The initial assessment is shown in the bottom line, with later assessments “stacked” upward. By following progression from earlier to later assessments, the teacher can see very clearly how a student is progressing toward mastery of the subject matter.

Caution should be exercised in interpreting this information. Students vary widely both in the smoothness and in the speed with which they master material. It is not always the case that progress made in the Learning Mode (green bar) is reflected in a student’s level of mastery on a subsequent assessment. I.e., some students progress more quickly in assessment than in the Learning Mode, due to the effectiveness of the teacher or to other factors. In such cases the “new” blue line is further ahead than the green line just below it. On the other hand, many students make faster progress in the Learning Mode than in assessment. In such cases the “new” blue line lags behind the green line below it. It is very common for a student to master the entire subject matter two or more times in the Learning Mode before that mastery is finally confirmed in an assessment. None of these situations is unusual. Part of the power of the **ALEKS** system is that it does not expect students to behave like machines, but makes allowance for a robust and unpredictable “human factor.”

NOTE. In cases where a student moves backward in his or her mastery, the teacher should make individual contact with the student. This student may be experiencing a personal problem, there may have been third-party help on an initial assessment, or there may be other external factors affecting the situation.

10 Moving a Student to a New Class

A student subscription to **ALEKS** entitles the student to work through as many subjects in the sequence as the student masters during the subscription

period. When a student completes the objectives of a class, **ALEKS** will allow the student to continue until the subject-matter is exhausted. At this point the student should be moved to a more advanced class.

For example, when a student completes the subject matter for a class whose course objectives corresponds to Arithmetic, the teacher should unenroll that student from Arithmetic in **ALEKS** and reenroll the student in a new class whose topic is set to Algebra. If no such class exists, it should be created so that the student is not prevented from making further progress.

It is possible to define classes within the **ALEKS** system in such a way that they include all subjects that the students are likely to begin learning before the end of the actual school class (e.g., Arithmetic & Algebra). This has the advantage that no students need to be moved from one **ALEKS** “class” to another. On the other hand, the experience of completing a subject and being “graduated” to another one is rewarding for the student. We recommend maximizing the opportunities for highlighting achievement in this way.

11 Ordering Assessments

Following the initial assessment (which should be taken under the teacher’s supervision), the **ALEKS** system will automatically schedule any other assessments needed for correctly informing and guiding a student’s progress. The instructor, however, can order an individual or group assessment at any time. It is a good practice for the teacher to schedule supervised assessments at regular intervals (interim and end of the class), as “snapshots” of overall class achievement. Assessments may be ordered more frequently if the teacher feels that there has been third-party help on some automatic assessments, producing invalid results.

12 Independent Study and Distance Learning

The **ALEKS** system is well suited to use in an independent study or distance learning context. **ALEKS** is self-contained and adaptable to any course objectives or class materials. Students using **ALEKS** under these circumstances know exactly what the class goals are, where they stand in relation to those goals, and where to find the instructional and practice tools to achieve them.

For the teacher administering an independent study or distance learning

program, **ALEKS** solves nearly every problem of management, oversight, evaluation, and communication. All of the information needed to keep track of far-flung independent learners is at the teacher's fingertips, through the features of the Teacher Module. The internal message system of **ALEKS** puts the teacher in constant touch with students without dependence on telephone or email communication.

13 The ALEKS Knowledge Structure

Each **ALEKS** subject, such as Beginning Algebra, has a knowledge structure associated with it. The knowledge structure for Algebra 1, for example, is covered by about 100 **ALEKS** items (or problem types). A knowledge state is a subset of items which may correspond to the knowledge of an actual student (i.e., there may be a student who has mastered exactly those items, and no others). A knowledge structure is the family of all the knowledge states that we may encounter for a given subject. In the case of Algebra 1, the knowledge structure contains about 50,000 knowledge states.

An **ALEKS** structure impacts virtually every aspect of **ALEKS**'s functioning. In the **ALEKS** assessment mode it enables **ALEKS** to make inferences from student answers, keeping the **ALEKS** assessments brief, but uncannily accurate.

The structure is also crucial in the **ALEKS** Learning Mode. Using the structure of Algebra 1, for example, the system knows precisely which items are in the inner fringe and outer fringe of each of the over 50,000 knowledge states in **ALEKS** for Algebra 1. The items in the outer fringe of a student's knowledge state are those items that the student is the most ready to learn next. (From a technical standpoint an item is in the outer fringe of a state if adding that item to the state results in a feasible knowledge state.) These items are presented to the student in MyPie when the student moves the mouse pointer over the **ALEKS** pie chart. Similarly, an item in the inner fringe of a student's state is an item either recently learned or one whose mastery by the student might be shaky. (Technically, an item is in the inner fringe of a state if removing that item from the state results in another feasible knowledge state.) They are presented to the student when the student is having difficulty in the **ALEKS** Learning Mode and during **ALEKS** review.

An additional benefit of the proliferation of connections among items in **ALEKS** is its extreme flexibility from the students' viewpoint: for any particular topic, there is a vast number of possible approaches, or learning

paths, which may lead students to mastery of that topic. This flexibility does not imply, however, that *any* order is possible. Each learning path leading to a particular topic must contain, at a minimum, the items which are “below” such topic in the **ALEKS** structure. That is, we may say that the more “advanced,” or “highest,” topics in an **ALEKS** structure are those for which the **ALEKS** system will require the student to learn the largest number of other items before those items will be presented to the student.

14 Modification of Course Objectives

Teachers do not need to create or modify the course objectives in order to use **ALEKS**. Every subject has a comprehensive default, which will be in effect without any actions on the teacher’s part.

In some cases it may be desirable to modify the course objectives used for a particular group of students. Extensive creation and modification of Standards and Course Objectives is possible in the **ALEKS** Advanced Teacher Module (See the *Teacher’s Guide*, chapter “Advanced Teacher Module: Standards & Course Objectives”). Please keep in mind the following points regarding the use of course objectives in **ALEKS**:

- A course objectives in **ALEKS** implies the existence of a knowledge state, that is, a possible configuration of a student’s knowledge, defined as the goal of the class. As such, all items in this “final” knowledge state of the course objectives must be learnable *within* the course objectives. This is determined in **ALEKS** by reference to the **ALEKS** structure (See above, Sec. 13). If an item is added to the course objectives in **ALEKS**, all other items which are “below” that item will also be added. If an item is removed, all other items in the course objectives which are “above” that item in the **ALEKS** structure will also be removed. The Course Objectives Editor warns when this is occurring.
- Thus it is possible to modify a course objectives in **ALEKS** only by “trimming” the tree from its branches, not from its roots.

ALEKS also provides a facility for creating multiple sets of course objectives within a single class (See the *Teacher’s Guide* under “Intermediate Objectives,” in the chapter “Advanced Teacher Module: Results & Progress”). The Intermediate Objectives feature makes it possible to prioritize particular sets of items for particular periods of time, by constraining the choices available to the students. When Intermediate Objectives have been set, students will be guided to these items by the shortest possible path. Items that

they are ready to learn, but are not on the shortest path to the Intermediate Objectives, will be “grayed out”; they will appear in the students’ pie charts, but the students will not be able to choose them.

15 Learning Rates in ALEKS

ALEKS allows teachers to flexibly evaluate and interpret student learning. There are four criteria, which can be used in any combination: percentage of course goals mastered, total hours spent in **ALEKS**, average items gained per hour of use, and average number of items gained per week of use. Each can be set to “Private,” so that only the teacher sees the evaluations, to “Public,” so that the teacher sees the evaluations for all students, and each student sees their own, or to “Disabled,” so that no one sees them.

Detailed instructions on the use of the learning rates feature may be found in the *Teacher’s Guide* under “Assign Learning Rates,” in the chapter “Advanced Teacher Module: Results & Progress.”

Caution must be exercised in determining which, if any, of these criteria should be set to “Public,” so that they are seen by the students. For example, if the evaluation for percentage of course goals mastered is set to A for 90 percent, B for 80 percent, C for 70 percent, D for 60 percent, and Failure below that, the students will see these letters in their accounts as long as their percentage mastery is in the ranges given (i.e., D when it is between 60 and 69 percent). Under normal circumstances, even good students will spend much time in percentage ranges that do not correspond to their expected grades, and they may easily be discouraged by seeing poor evaluations in their accounts. The point is that they are being evaluated not for the point in the class where they are currently working, but for the end of the class. For this reason, the teacher should explain very carefully to the students what the evaluations signify, if the decision is made that they should be “Public.”

The same proviso applies to the other kinds of evaluations available through **ALEKS**. The value of using these evaluations in the “Public” mode may be greatly enhanced if the teacher decides to set a new scale every week, or at other appropriate intervals. This might mean, for example, that A is set to 20 percent for the first week, to 25 percent for the second week, and so forth, with the other evaluations set accordingly. Such a procedure requires more work by the teacher, but it certainly gives the students a more meaningful frame of reference for their progress.

Some of the kinds of evaluations in **ALEKS** may be more useful for the teacher alone than for the students. Such evaluations should be set to “Private.” The evaluation based on average items gained per week, for example, might be set to some minimum value like 3 (in an Algebra class requiring 3 hours of work in **ALEKS** per week). Now, the teacher would not want to send the message to the students that 3 items gained per week is “Enough,” since many students in the class may be capable of much more. Conversely, a student whose progress falls below this rate might not be helped by the stern notation in their account that their progress is “Not enough”; the reasons for slow progress may be varied. At the same time, a student making slower progress than this should be brought to the teacher’s attention for intervention of some kind. If the evaluation is set to “Private,” the teacher will see the flag “Not enough” appearing next to the names of students whose progress is slower than this, on the Class Progress page, alerting them to the need for special attention.