It seems that recently there has been a virtual explosion of pieces of software to be used in the role of computer aided learning. Almost every book and publisher has their own variation. In this sea of choices Hawkes Learning System provides a distinctive array of products with a long history of development. This review will concentrate on the College Algebra product which is part of a full spectrum of software options that cover classes from Basic Mathematics (something akin to High School Algebra) to Elementary Statistics.

In contrast with other options this software is not web-based, but is installed on your own computer. This feature makes the software ideal for students who may have access only to a dial-up connection, and makes the performance of the software refreshingly responsive. It also removes the headache of having to install a plethora of plugins. The software only uses web access at two stages. The first is once you have identified yourself to the software by entering your access code. The program makes contact with Hawkes’ central server to download the curriculum settings for your section that have been set up by the instructor.

This done, the student is presented with a menu page of the course chapter headings, much like the contents page of a textbook. The list of chapters and sections are keyed to a College Algebra text by Paul Sisson, but all of the standard material is covered, and the software could easily be tailored to complement another text if needed.
Once the choice of chapter and section has been made the user is taken to the instruction section of the software. The interface is very clear and uncluttered. The student learning experience is implemented in three different modes of instruction. This choice is made by clicking on one of the three large buttons down the left hand side of the screen.

The first button is the *Instruct* section. This is a multi-media presentation of the material in that section of the course notes – an electronic textbook which provides definitions, properties, illustrative examples and hints. This material is clearly written and well presented, and makes a helpful addition to classroom notes and the textbook. An audio feature allows the software to read the on-screen text to the user. There are also short videos provided for many sections.
However, the main strength of the Hawkes system is as a tool to allow students to practice the skills that they are learning. This type of instruction is dealt with in the other two instruction modes. Clicking the Practice button presents the student with an algorithmically generated problem from a bank of problem types chosen by their instructor. The problems themselves are well constructed. In contrast with many such packages almost none of the problems are multiple choice. Instead the problems have the feel of the standard examples that one might have set from the exercises in a textbook, and require the student to do equivalent work and provide the answer in algebraic format.

The advantage here is that instead of the limited supply from the text, the student can now work as many problems as they need.

Students can choose their own learning pace by adjusting the level setting at the bottom of the screen. The student can choose to begin their practice with an easy problem, begin in the middle, or go straight to the more challenging problems. A nice feature is the progressive level. With this setting the software gradually leads the student through harder and harder problems, until they are able to master the skill, much as a human tutor might.
The answers are entered by using an elegantly simple menu bar that appears when the cursor is placed at the right-hand side of the screen. The usual keystroke shortcuts, for example such as \(^\) for an exponent, can also be used as comfort allows. The menu-bar has a constant format, and so the student can get no artificial clues as to the type of answer that is expected.

Once the answer is in a form that the student feels is correct they can submit it by clicking the large button with an S, or by pressing enter. A correct answer is greeted with another problem to try. An incorrect answer gives a choice of trying again to correct the mistake. Choosing the other options allows the software to explain the error. The software is able to recognize when any of a large number of common mistakes has been made and is able to make helpful suggestions about correcting those misconceptions.

Next to the submit button is the T button which takes the student to the Interactive Tutor. This mode allows the software to lead the student step by step through the solution of the exact problem that they were working on. Once they have seen the guided solution for their problem, it then presents them with another algorithmically generated example of the same type for them to work.
All of the Hawkes software is built around a mastery philosophy of learning. The students may work in Practice mode for as long as they like, but the equivalent of the traditional homework assignment is the Certify mode. The student may take this randomly generated test as many times as they wish, but to complete the assignment (or certify) they must be able to work the assignment making fewer than a predetermined number of errors or strikes—this level of mastery can be controlled by the instructor for each assignment. The look and feel of the Certify mode is just the same as Practice, except that color of the background is changed, and more importantly the possibility for using the Interactive Tutor is now removed. The student must now show that they have mastered the skill. Answers not simplified in the certify mode are given the opportunity for one shot at simplification before being marked incorrect.

A student can choose to stop in the middle of certification to come back later, if perhaps they need to stop for lunch or go to class. Once the student successfully completes the assignment they are greeted with a message congratulating them on certifying in that skill. A record of that work is then automatically logged in the instructor’s online gradebook.
If they make more mistakes than the determined number of strikes they are invited to return to the Practice mode to further hone their skills before returning to try once again to Certify.
The instructor interface is a combination of web-based and computer-based sections.

The Lesson editor allows the curriculum to be completely specified to the instructor’s criteria. It is here that the instructor may choose exactly which types of problem will appear in each of the sections of the material covered in the course, how many problems will be required for certification in that section and how many strikes will be allowed. It is these settings that the software downloads when the program is first opened.
The Gradebook is implemented online, and in contrast to the software that is limited to a windows platform, runs happily on both Mac and PC. The gradebook provides a variety of viewpoints of the students’ grades and progress. These range from the standard grade totals to being able to see how long students spent certifying in a particular section in comparison with the time they spent on the lesson in total.

It is here that assignment due dates may be chosen by the instructor. There are a variety of options to penalize late work if so desired. Grades can be exported and imported to and from Excel files quite conveniently. The Online Grade Book provides a convenient interface from which the instructor can easily monitor the progress of even a large class.
All this said the most important feature of the Hawkes Software is that it works. My department chose to use this software in preference to others after conducting a sequence of careful classroom trials. Pilot sections compared the performance of students using this and another software to students taught in the traditional way. The results were quite surprising.

300 students at the University of Mississippi took College Algebra from the same instructor. 100 students used HLS, 100 students used Software B, and 100 students used no software (book only). All students were given the SAME final exam at the end of the semester, below are the average scores for all three groups:

HLS students: 81% (B)
Software B students: 68% (D)
Book only: 70% (C)

The main comparison was based on the grades which the students achieved on the written cumulative final exam. This seemed to be an important measure of the level of skill and understanding given by each learning method. Whereas the alternative software made little change to the final exam grades of students compared to traditional textbook assignments, the performance of the group that used the Hawkes software was radically different. The expected ‘normal’ curve of grades was replaced by data in which the mode grade was over 90%.
We have been implementing this software as part of the learning experience in our lower division math classes ever since. In this way we have been able to step away from a model in which learning mathematics is a spectator sport and to move towards one in which mistakes and repeated practice allow students to master their mathematics.

I hope that this brief overview has given something of the flavor of the experience of using this software. There are many other excellent and useful features that have not been discussed here, but my experience has been that these may be learned very quickly and easily. This is an exciting new pedagogical tool, and instructors will find Hawkes Software products an excellent addition to the classroom.