Alphabet Adventures

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Some classroom activities are methodological staples, like the quart of milk, loaf of bread and laundry detergent that my aunt Esther always asked us to bring her when we went to the grocery store. These lesson formats survive, while educational fads come and go, because they are simple, philosophically non-partisan, and intrinsically engaging.

As the November and/or December school holidays approach, perhaps many of you will decide to carry on the pedagogical tradition by giving your students hidden word matrices, lotto games, crossword puzzles, or similar classic learning activities to do. One such popular pursuit is what has been called an alphabit; a word from which smaller words can be formed by rearranging component letters.

Perhaps you remember being asked to do this with the words THANKSGIVING or CHRISTMAS when you were a student. The goal is usually to form as many subwords as possible from the letters in the alphabit, making sure that the words constructed do appear in the dictionary. As a teacher, you may now notice that this is an effective way to encourage spelling practice, vocabulary exploration, and collaborative student efforts. Some simple Logo tools may assist this time-tested educational activity, so that your students can concentrate fully upon forming and researching words, instead of dividing their attention between such exploration and the mechanics of playing this sort of educational game.

Choosing Challenges

One easily-amended Logo tool procedure can store alphabits with which to work.

TO WORDS
OUTPUT [JURISDICTION QUALIFICATION
HEMOGLOBIN ENIGMATIC NEVERTHLESS
SEDENTARY HORSERADISH UNEMPLOYMENT
SATISFACTION ADVENTURE COMPLEXITY
DANDELIONS]
END

Another tool, used in tandem with WORDS, can direct the computer to choose an alphabit with which to challenge the student. The well-known PICK procedure will do this nicely.

TO PICK :OBJECT
OUTPUT ITEM ( 1 + RANDOM COUNT :OBJECT ) :OBJECT
END

These two tools can be combined in a number of ways, such as

PRINT PICK WORDS

To which the computer may respond

SATISFACTION,

or

MAKE "ALPHABIT PICK WORDS

if the choice should be retained as the value of the global variable ALPHABIT.

Lexicographic Requests

To facilitate experimentation with the letters of an alphabit, the computer can check to see that subwords that a user forms are indeed only comprised of letters contained in the alphabit itself, and keep a record of all such subwords formed.

The superprocedure BEGIN randomly chooses an alphabit challenge. (Please note that all procedures are written in LogoWriter 2.0, but can easily be adapted to function with any full-featured Logo).

TO BEGIN
CC
MAKE "ALPHABIT PICK WORDS
MAKE "SUBWORDS []
SOLUTIONS
HT
CT
PRINT SENTENCE [Please spell a word using some of the letters in:] :ALPHABIT
CD
MAKE.WORDS.FROM :ALPHABIT
COMPARE.WITH.LIST.FOR :ALPHABIT
END

The subprocedures MAKE.WORDS.FROM and TEST.LETTERS.IN prompt the alphabetic explorer to form words, automatically checking them against the alphabit's component letters before committing user-generated subwords to a list of successes.

TO MAKE.WORDS.FROM :WORD
TYPE [YOUR WORD?]
MAKE "SMALLWORD FIRST READLISTCC
IF :SMALLWORD = "q [STOP]
TEST.LETTERS.IN :SMALLWORD :WORD
MAKE.WORDS.FROM :WORD
END
Logo Linx--continued

TO TEST.LETTERS.IN :SUBWORD :WORD
IF EMPTY? :SUBWORD [MAKE "SUBWORDS
   SENTENCE :SUBWORDS :SMALLWORD
   STOP]
IFELSE MEMBER? (FIRST :SUBWORD) :WORD
   [MAKE "WORD REMOVE (FIRST :SUBWORD) :WORD] [TRY.AGAIN (FIRST
   :SUBWORD ) STOP]
TEST.LETTERS.IN (BUTFIRST :SUBWORD) :WORD
END

The Letter of the Lexicographic Law

As you can see, both of these procedures are written using
tail-recursive structures, one nested within the other. MAKE.WORDS.FROM prompts the user repeatedly for
subwords; TEST.LETTERS.IN checks their entries against
the letters from the original alphabit. Allison Birch’s RE-
MOVE tool is especially helpful in this application for making
sure that students use only the
letters contained in the alphabit.

TO REMOVE :ITEM :OBJECT
   IF EMPTY? :OBJECT [OUTPUT :OBJECT]
   IF :ITEM = (FIRST :OBJECT ) [OUTPUT
   BUTFIRST :OBJECT]
   IF LIST? :OBJECT [OUTPUT PPUT (FIRST
   :OBJECT ) REMOVE :ITEM BUTFIRST
   :OBJECT] OUTPU
   T WORD (FIRST :OBJECT ) REMOVE
   :ITEM BUTFIRST :OBJECT
END

If an error of this type is made, TRY.AGAIN gives the user
specific feedback on the nature of his/her lexicographic trans-
gression.

TO TRY.AGAIN :LETTER
   PRINT (SENTENCE [Sorry! There aren’t
   enough] WORD :LETTER “’s [in]
   :ALPHABIT [to spell] :SMALLWORD )
   CD END

Monitored Musing

Once the user decides that they would like to stop entering
subwords, they can type ‘q’, which is recognized in
MAKE.WORDS.FROM as the cue to return to the last line of
BEGIN, and execute COMPARE.WITH.LIST.FOR :WORD.

TO COMPARE.WITH.LIST.FOR :WORD
   CT PRINT (SENTENCE [You have formed]
   COUNT :SUBWORDS [words from] WORD
   :ALPHABIT “). )
   CD PRINT (SENTENCE [There are] THING
   :ALPHABIT [words with four or more
   letters that can be made from the
   word] WORD :ALPHABIT “). )
   CD PRINT SENTENCE [To see a list of
   these subwords, type CT LOADTEXT]
   WORD “” :ALPHABIT
   CD PRINT [To see a list of your words,
   type CT PRINT WORD :SUBWORDS]
END

The number of user-generated subwords can therefore be
compared with current across-user totals. If the student would
like to see a list of their words, or a screen of possible
subwords, they can access these by following on-screen
directions printed with lines 7 and 9 of
COMPARE.WITH.LIST.FOR :WORD. To conserve mem-
ory space and expedite tool execution time, lists of possible
subwords are stored in separate text files formed with a word
processor and accessed with the LOADTEXT command.

TO SOLUTIONS
   MAKE "JURISDICTION 78
   MAKE "QUALIFICATION 81
   MAKE "HEMOGLOBIN 60
   MAKE "ENIGMATIC 48
   MAKE "NEVERTHELESS 73
   MAKE "SEDENTARY 80
   MAKE "HORSERADISH 79
   MAKE "UNEMPLOYMENT 79
   MAKE "SATISFACTION 57
   MAKE "ADVENTURE 76
   MAKE "COMPLEXITY 61
   MAKE "DANDELIONS 79
   END

The words themselves can act as global variable names,
each storing the current number of component words that have
been correctly formed from alphabit letters. In this case, these
values are assigned in a SOLUTIONS procedure (called in
BEGIN), and refer only to subwords of four or more letters.
Alphabits in Action
It is a testament to the power of a good idea and the versatility of Logo text primitives that rich spelling and vocabulary exploration such as this can be structured and supported with just 9 tool procedures. The explorative environment that they can create for users is reflected in the following sample session.

----------------ALPHABIT 5----------------
Please spell a word using some of the letters in: QUALIFICATION

Type BEGIN to start game; Q to quit.
YOUR WORD? aqua
YOUR WORD? coin
YOUR WORD? facial
YOUR WORD? flaunt
YOUR WORD? tail
YOUR WORD? uncoil

----------------ALPHABIT S----------------
Please spell a word using some of the letters in: QUALIFICATION

Sorry! There aren't enough l's in QUALIFICATION to spell quill

Type BEGIN to start game; Q to quit.
YOUR WORD? quill
YOUR WORD? q

----------------ALPHABITS----------------
You have formed 3 words from QUALIFICATION.
There are 81 words with four or more letters that can be made from the word QUALIFICATION.
To see a list of these subwords, type CT LOADTEXT "QUALIFICATION"
To see a list of your words, type CT PRINT : SUBWORDS

---------------~PHABITS----------------
acquaint coil finical natal
acquit coin flat nautical
alit cola flaunt quail
aloft colt flint quaint
anal count flit quit
anil cult foal quint
antic facial font quintal
aqua fact fowl quit
atonal faction fount quoit
aunt factional incult quota
ciaftan factual into tail
canal fail laic talc
cant fain licit talon
cation faint lift toil
cilia fatal lint tonal
clan fault lion tonic
clost fiat loci tuna
cool fiction loft tunic
coot fictional loin uncial
cooti finial nail uncoil
unfatal

The 12 text files and tool procedures that were used to develop this language arts Logo application can be obtained in diskette form from the author. If this is your preference, please send her a self-addressed, sufficiently stamped diskette mailer with a 5.25" diskette inside.

References

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