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## Developing Educational Software Within Application Software

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### **Abstract**

There are some standard application softwares developed to meet the specific requirement of the user needs. These softwares are not able to meet all the needs. In order to enhance the capability of the application software, a facility to develop software tools or utilities is being added to the off-the-shelf application software. It is normally called as macro language. The programming methodologies of such scripting languages differ from application to application.

Normally, educational softwares are developed using special authoring tools instead of the standard programming languages. The distributed educational software contains the core engine developed by the authoring software developers.

As there are quite a few popular softwares such as MS Office, StarOffice etc that are used extensively on the desktops. This author started exploring the capability of developing educational software within these applications. Interestingly, it was found that some of the popular application softwares available for desktop can be used for developing educational software with multimedia capability. This paper aims at demonstrating the capability of the standard application software MS Office to develop educational software.

### **Introduction**

Developing educational software within the off-the-shelf software is a value added proportion to the off-the-shelf software and value for money proposition to the user. This type of development of software extends the existing off-the-shelf software to new areas like education. The potential of off-the-shelf software to develop educational software within it would extend the use of existing computers and software for educational purposes.

Developing educational software within off-the-shelf software opens new avenue for software houses. It enables the development of customizable software where in the contents can be contributed by the teacher community.

## **Overview of educational software**

Educational softwares are developed to motivate the learner with multimedia contents. The multimedia based educational software comes with varying capability of interactivity and animations. The user interfaces are designed with graphics and appropriate music and voice over.

## **Authoring Tools**

Generally the multimedia softwares are developed using standard authoring tools like Macromedia Director, Flash etc. These authoring tools are having facility to distribute the running version.

## **Application software as a developmental Tool**

In contrast to Authoring tools, the standard applications do not have the facility to create standard executables. The software developed using the application software runs within the application. This limits the reach of the software developed using an application. However, if appropriate application software is selected for development of educational software, then the reach actually depends on the availability of the application software.

Even though, the application software is capable of providing the development facility, additional programming is needed to turn the application into educational software.

The widely used application softwares such as MS Office, Photoshop, StarOffice, OpenOffice, After Effects, ARC info, Microstation etc supports programming, which can be used for developing educational software.

## **Features of off-the-shelf applications to support development of educational software.**

Nowadays, the off-the-shelf application software developed with open-end technologies to enable the programmer to add additional features. The number of off-the-shelf softwares that provide support for developing applications are growing. It would be helpful to know the features in considering the off-the-shelf software for developing application. Some of the features would be:-

1. **Inexpensive:** As the application developed is within the off-the-shelf software, the off-the-shelf software should be inexpensive to the end user to use the application software. Otherwise, the off-the-shelf software should be a kind of de facto software which may be widely used and familiar to the users.
2. **Tailorable:** The off-the-shelf software should provide "events", "hooks" or "methods" to let the programmer to trap the appropriate actions and add or modify the existing features.
3. **Design:** The off-the-shelf software should have facility to add programmable controls such as menu, toolbar etc.
4. **Multimedia:** Multimedia based educational softwares are always attractive and interesting to the learners. The off-the-shelf software should provide facilities for varieties of transitions, special effects, graphics and sound support etc. Apart from that it should also support wide range of file formats.
5. **Scope:** Educational software requirement start from simple objective type exercise to high graphics intensive skill development through analytical charts. The off-the-shelf software should provide facility to develop wide range of software.

## Using MS Office for developing application software

Developing application software within the off-the-shelf application software started way back from 1987 when Excel was released with programming capabilities. From Microsoft Office 97, every application of the office suite is having programming language called VBA.

### The advantages of MS Office-based development

Some of the advantages in using MS Office for software development are:

- Proven : The development tools are of proven quality.
- Faster : By extending the functionality, one can build application faster.
- Familiar : As the users are familiar with MS Office, the applications developed with MS Office will also be familiar and easy to use by the users.
- Cheaper : As no cost is involved for development tool, the cost for developing applications would be cheaper.
- Flexible : The programming tool is flexible in accessing and defining objects for developing applications.
- Customize : The standard interface of application softwares can be customized by adding or deleting commands, menu items, tool bars, scroll bars etc.

### Using MS Office applications for Education

The number of study hours is so extensive and the material available is not sufficient for intensive learning. One way to make the learning more interest and intensive is to automate the learning materials.

The computerized learning materials provide immediate feedback to the students and provide an opportunity to practice specific topic at their own pace.

The computerized learning materials also include testing components. The teachers exposed to computers prepare question papers and notes using computers. The specialised testing programs do require all the texts and questions re-entered due to the difference in the formats. It amounts to repeat of text entry in the word processor and the specialised testing programs. Wouldn't be nice if the same word processing software used by the teacher to prepare learning materials and question papers used for testing as well.

The MS Office applications are having standardised methods of exchange of data amongst themselves and having common interface components. Some of the programmable tools of MS Office are:

- \* Menu bar
- \* Endnote
- \* Index
- \* Tool bar
- \* Comments
- \* Dialogs
- \* Status bar
- \* View options
- \* Forms
- \* Screen tips
- \* Bookmark
- \* Documents

* Office assistant	* Formatting controls	* Documents control
* Clipart gallery	* Frames	* Events
* Audio files	* Split Window	* Find and replace
* Drawing tools	* Autocorrect	* Automation
* Word Art	* Mail merge	* Zoom
* Chart	* Document protection	* Envelope, labels etc
* Font controls	* Tables	* Header and Footer
* Footnote	* Layout	* Context menu

As investigated by the author, MS Office provides a very good development environment, flexibility for developing applications.

### **Developing computerised test materials in a document using MS Word**

Nowadays, irrespective of whether tests are conducted using computerized methods or by using only paper and pencil, computers are used for preparing test materials. One can easily make use of MS Office for computerised tests.

The simplest one could be with just simple controls like text box, option buttons, check box, toggle buttons.

Now, let me demonstrate as to how to create a simple test paper.

1. Type the text using your favourite Tamil interface software.
2. Check whether control toolbox is displayed on the tool bar or not. If not select control toolbox from View - Toolbars.
3. Type the questions as normal text or as a label using label control from the control box tool bar.
4. Use controls like check box, option button and toggle button as appropriate to give options to the questions.
5. Use Text box to give any instructions to any user.

Now, your document would look like the one shown in figure 1.

Tamil Electronic test paper - Microsoft Word

File Edit View Insert Format Tools Table Window Help

Normal TAM\_Janani 12 B I U

வாசித்துணர்தல்

கீழுள்ள பகுதியை கவனமாகப் படித்து கேள்விகளுக்குப் பொருத்தமான பதில்களைப் தெரிவுசெய்யவும்

## குரங்கும் குருவிகளும்

ஒரு மரத்தில் தூக்கணாங் குருவிகள் இரண்டு கூடு கட்டி வாழ்ந்து வந்தன. பக்கத்து மரத்தில் ஒரு குரங்கும் வாழ்ந்து வந்தது. ஆனால் அதற்குக் கூடோ வீடோ இல்லை.

ஒரு நாள் திடீரென்று மழைபெய்யத் தொடங்கியது. குரங்கு மழையில் நனைந்து குளிரில் நடுங்கிக் கொண்டிருந்தது. அதற்குத் தங்குவதற்கு இடமில்லை. மழை பெய்து கொண்டே இருந்தது.

குருவிகள் இரண்டும் தங்கள் கூட்டுக்குத் திரும்பி வந்தன. அவை கூட்டுக்கு உள்ளே போயின. ஒரு குருவி குளிரில் நடுங்கிக் கொண்டிருந்த குரங்கைப் பார்த்தது. பரிதாபப்பட்டது. "குரங்கண்ணா குரங்கண்ணா! நீயும் எங்களைப் போல் ஏன் கூடு கட்டி வாழக்கூடாது." என்று கேட்டது. குரங்குக்குக் கோபம் வந்து விட்டது. சின்னக்குருவி எனக்குப் பத்தி சொல்வதா? "குருவியே, எனக்குக் கூடுகட்டத் தெரியாது. ஆனால் கூட்டைப் பிரித்து எறியத் தெரியும்" என்று சொல்லிக் கொண்டே குருவிகளின் கூட்டைப் பிரித்து எறிந்தது. பாவம் குருவிகள். முட்டாள்குக்குப் பத்தி சொன்னது தவறு என்று எண்ணி வேறு ஒரு மரத்துக்குப் போயின.

1. குரங்கு மரத்தில் கூடு கட்டி வாழ்ந்து வந்தன?

2. குரங்கு கடைசியில் என்ன செய்தது?

தனக்கு என்று ஒரு கூடு கட்டியது

குருவிகளின் கூட்டைப் பிரித்து எறிந்தது

குருவிகளைத் திட்டியது

3. இக்கதையில் வருபவை யாவை:

வீடு  குருவிகள்  குரங்கு

மரம்  கூடு  மழை

4. குருவிகள் வாழும் இடத்தின் பெயர் என்ன?

ஆப்பிள்சாப்ட், பெங்களூர் - 10 செந்தமிழ்

Page 1 Sec 1 1/1 At 7.4" Ln 36 Col 2 REC TRK EXT OVR English (U.S)

Figure 1

Tamil Electronic test paper - Microsoft Word

File Edit View Insert Format Tools Table Window Help

Normal TAM\_Janani 12 B I U

வாசித்துணர்தல்

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## குரங்கும் குருவிகளும்

ஒரு மரத்தில் தூக்கணாங் குருவிகள் இரண்டு கூடு கட்டி வாழ்ந்து வந்தன. பக்கத்து மரத்தில் ஒரு குரங்கும் வாழ்ந்து வந்தது. ஆனால் அதற்குக் கூடோ வீடோ இல்லை.

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4. குருவிகள் வாழும் இடத்தின் பெயர் என்ன?

குருவிகள் வாழும் இடத்தின் பெயர் கூடு

ஆப்பிள்சாப்ட், பெங்களூர் - 10 செந்தமிழ்

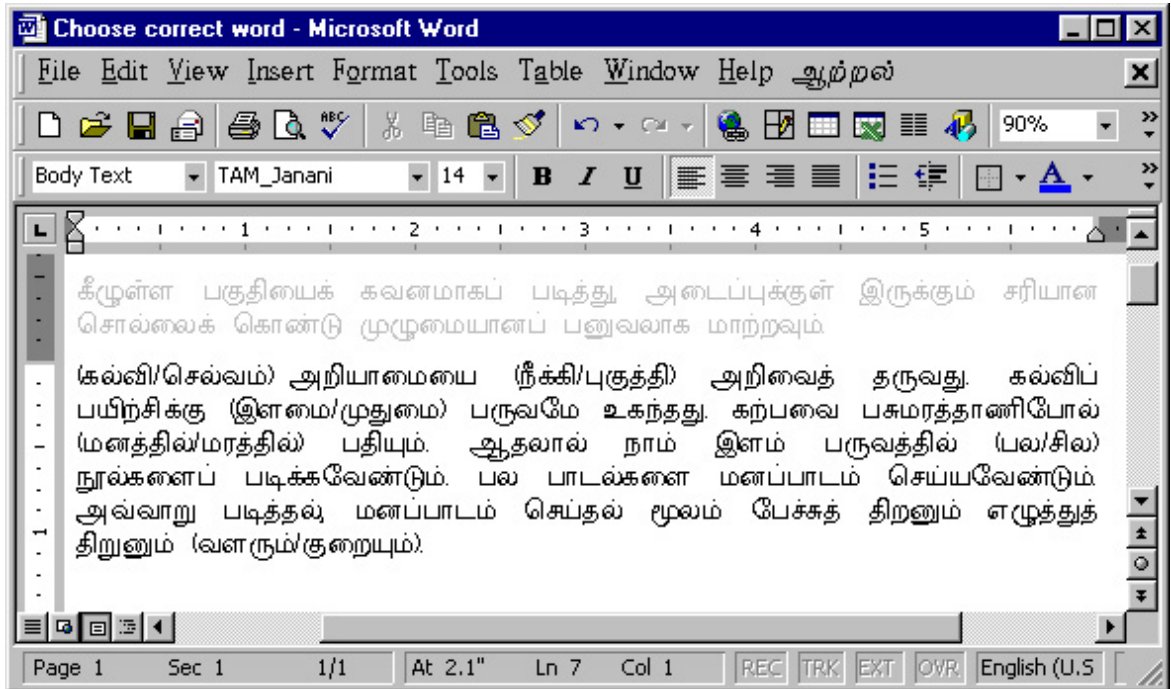
Page 1 Sec 1 1/1 At 1.5" Ln 6 Col 1 REC TRK EXT OVR English (U.S)

The document is now ready for test and can be used by the student. Students can attempt the questions and submit the document for valuation. The document can also be protected with password. The document would look like the one shown in Figure 2.

### Automating computerized tests in MS Word

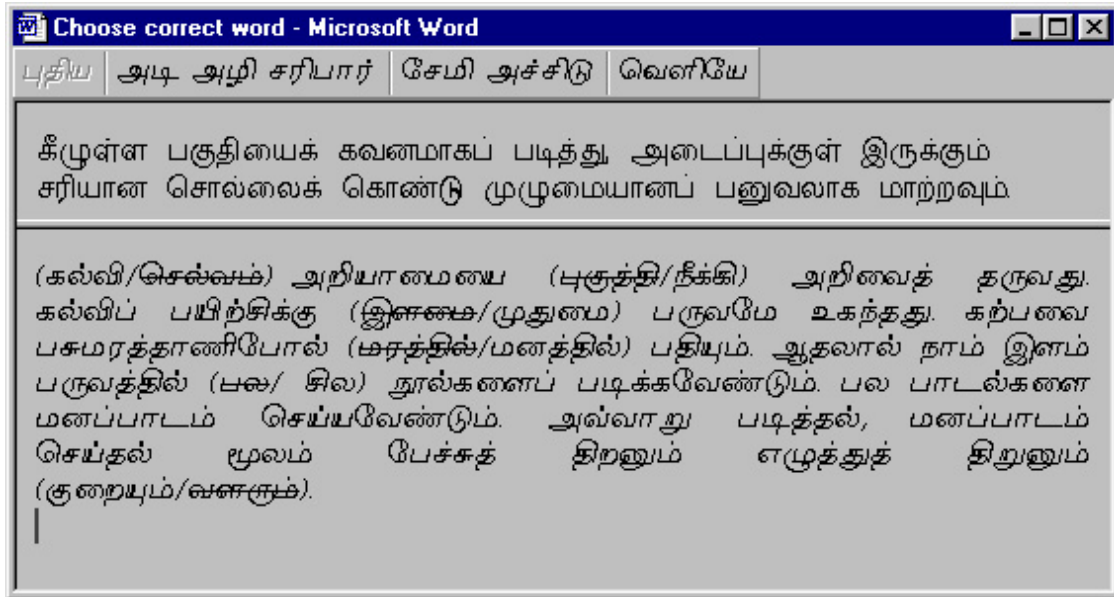
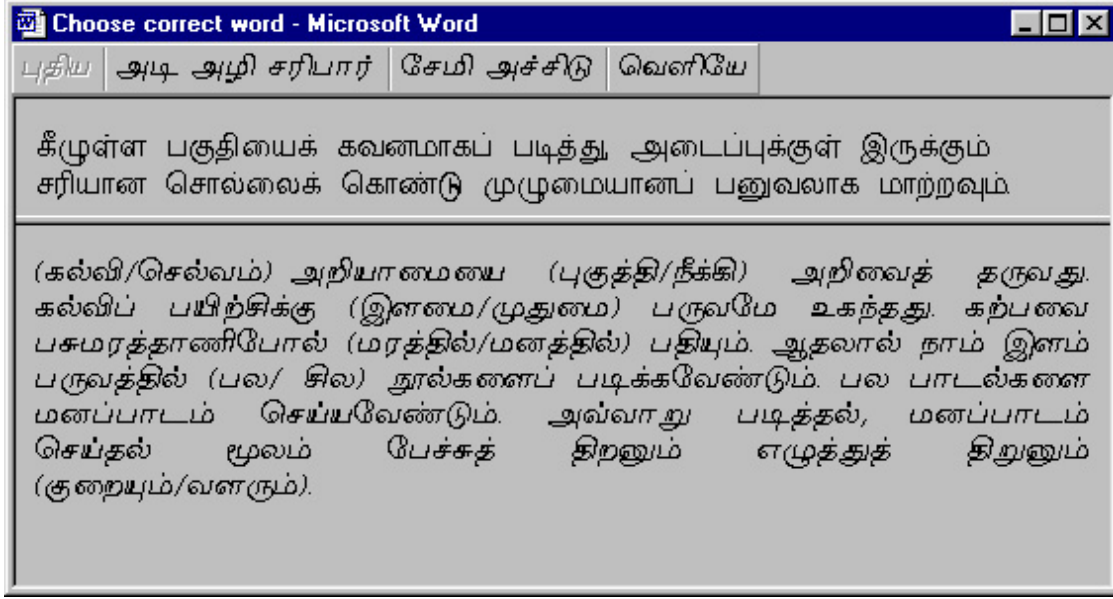
The valuation can be made automatically by adding some programming. At APPLESOFT, we have developed some on-line exercises. These exercises are intuitive and simple to use. The exercise I am going to demonstrate is on developing writing skill. Now, let me demonstrate as to how to use the on-line exercise:

Step 1. Type the passage with right answers to come first. And also type the necessary instructions in the Header. Screen capture of the document is shown in figure 3.



Step 2. Create an exercise from the game's menu (added by installing the educational software developed by APPLESOFT). Now the document is protected and saved. This document can be shared amongst the users of this software.

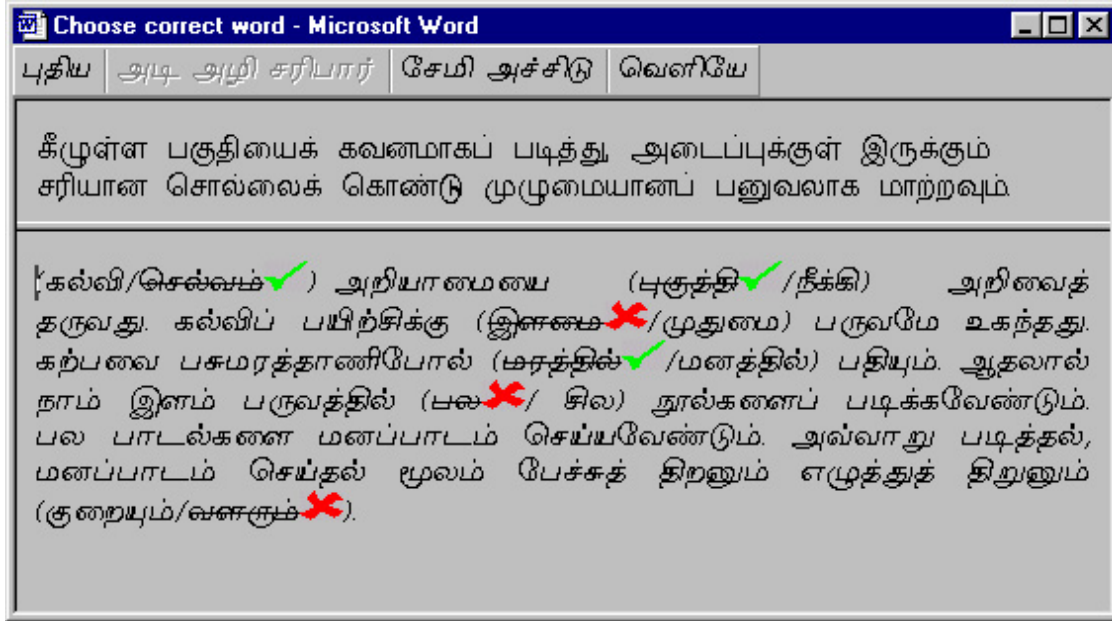
Step 3. Now, the interested student can play with the online exercise. The students are provided with appropriate options in the menu bar. The screen capture is shown as figure 4.



Step 4. Students attempt on the exercise and the resultant screen is shown in figure 5.

Step 5. When the student opts to "saripar", the exercise is evaluated and a visual feedback is provided. The screen capture is shown in as figure 6





As the documents are protected by the program, the documents can easily be shared or submitted to teacher through e-mail.

MS Word provides a facility to automate the tasks called macros. These macros can be created in two ways - by using macro recorder and the Visual Basic Editor, which is part of MS Office.

A macro can be created to automate any task like to change line spacing, to track an event etc., within any of the MS Office applications such as MS Word. To record a macro click on Record New Macro ... from Tools-> Macro. Now, by following the instructions one can record the macro for the required task. For more details please refer to MS Word help.

To write macros yourself, click on Visual Basic Editor from Tools-> Macro or press Alt+F11. Now a Visual Basic Editor is opened. Now you can write your macros.

In MS Office applications, all the objects like Document, font, buttons etc can be programmatically controlled. In case of any difficulties in knowing the exact objects used for a particular task, one can find the objects by recording a macro using the macro recorder.

It is interesting to note that MS Office supports extensive programming with support for standard API functions and automation facilities.

### Using OpenOffice for developing application

OpenOffice is an open source office suite supported by Sun Microsystems, inc. OpenOffice is having built in programming language called Star Basic. This author has tried programming in OpenOffice and it was found that OpenOffice also supports good programming environment and is flexible. It is to be noted that the source code written for MS Office cannot be used with OpenOffice and vice versa.

### Limitations of developing applications within Off-the-shelf software

Normally, any application software is being developed to meet a specific requirement is expected to run as a standalone software. However, any such application would require the

Operating System. The following are the limitations of developing applications within an off-the-shelf software:

1. Application can't be a standalone software. Execution of the application needs the off-the-shelf software on which it has been developed.
2. Availability of the off-the-shelf software limits the use of the application software.

### **Pros and cons of developing applications within MS Office**

Some of the pros and cons of developing applications within MS Office are:

1. The distributable versions can't be created as DLL or EXE from within the MS Office applications. However, by using automation techniques one can create Exe or Dll from VB.
2. The forms in applications developed within MS Office do not have resizable options like Minimize, Maximize and sizing.
3. Dialogs can't be created within VBA application. However, one can use the system dialogs.
4. One can create his own objects in addition to the objects available within MS Office.

### **Educational software developed at APPLESOFT using MS Office**

At APPLESOFT exploring MS Office started during 1996. By continuously exploring MS Office, many interesting tools and software have been developed. It would be interesting to know the kind of applications developed for educational requirement.

1. Surabhi tools - A set of utility tools for the students, teachers and any language users.
2. Aatral - A pack of six Tamil learning games to develop various language skills.
3. Visaithamizh Professional - An advanced typing learning tutor for Tamil 99 keyboard layout. It also contains additional utilities for learning Antonyms, Synonyms etc.

### **Conclusion**

It is amply demonstrated that developing applications within the popular off-the-shelf application software are worthy try at the time of reduced funding for computerized educational systems. It is a good start to start developing applications in popular office suites like MS Office, StarOffice, OpenOffice, Lotus Smart suite etc.