INNOVATIVE TOOL FOR CUSTOM COURSE BUILDING AND DELIVERY

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ABSTRACT

Milwaukee School of Engineering (MSOE) has a strong commitment towards practicing professionals in the industry. MSOE's Applied Technology Center regularly offers professional education seminars in the field of Fluid Power and Motion Control since the year 1958. Seminars are designed to keep engineers and managers abreast of cutting-edge technological development, current applications and newly developed techniques. While some of these seminars focus on the foundation of fluid power, others explore more advanced sophisticated concepts in a high-tech, applications-oriented environment. MSOE invested in developing "MSOEPE Seminar Builder", which is software designed to customize and effectively present fundamental to sophisticated engineering concepts. The needs behind developing such software was first to build learning blocks with predetermined outcomes, second is to use these blocks and customize seminar contents based on varying needs of the audience. The software will be explored, its features will be explained and cooperation opportunities will be discussed.

INTRODUCTION

MSOE's Applied Technology Center is offering professional education seminars in the field of Fluid Power and Motion Control for 49 years without interruption.

A set of basic to advanced training seminars have been developed to meet the training requirements of the industry professionals that have various backgrounds. In view of the market increasing demand, new topics are under development. Training material updating is a continuous process to keep it dynamic, tracking the technology changes. These seminars are offered on campus for public groups, or on customer site for private companies. In the later case, the topics and contents are customized to the audience. English or SI system of unit may be part of the seminar customization. Various fluid power components principle of operation can't be descriptively explained without multimedia tool like animation or video. For the whole above mentioned reasons, a need for a tool to help the instructors for custom seminar building and delivery became necessary.

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HOW IT WORKS?

In this paper the name "chapter" will be used to represents the smallest learning block and the name "seminar" for a collection of chapters gathered in certain sequence to make a course. Table 1 shows a summary of sequential steps to be taken in order to customize any number of seminars from a pool of chapters. The following are the interpretations of these steps.

In the first step, the seminar database will be created for one time and it will be used for future seminar building. Eight main directories must be created under a root directory (C:\MSOEPE) as shown in left hand side of Fig.1.

Four empty text files with names, as shown in the right hand side of Fig.1, must also be created under the main directory (7-SeminarDB). The names and location of the directories and text files are predefined to the software.

In step 2, power point presentation is to be developed for each new chapter and saved under the directory (8-Courses). In step 3, the developed power point must be saved as individual metafiles and positioned in a subdirectory with the chapter's name under the main directory (6-slides). Chapter name must be added to the (GeneralChapterList) text file. The software is capable of presenting animation and video types of media. In step 4, animation and video clips must be saved under the first and second main directories, respectively.

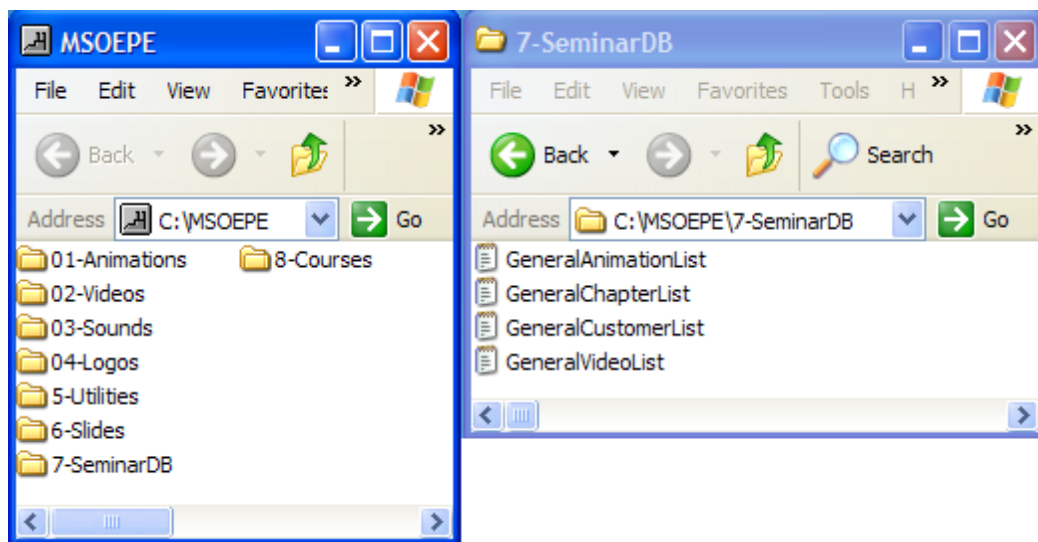| Step #	Action	Frequency
Step 1	Create seminars database directories and the relevant empty text files.	One time
Step 2	Develop power point presentation for each chapter and add it to the seminar database.	For each new chapter
Step 3	Convert the power point into individual metafiles and add it to the seminar database.	For each new chapter
Step 4	Add the media clips to the seminar database	For each new media
Step 5	Add the students' group name and logo to the seminar database	For each new group
Step 6	Use the software tool to assemble the seminars	For each new seminar

Table 1 How it works

Fig.1 Seminar Database

The media name must be added to the relevant text file of the seminar database. Optionally, the power point may include a reminder note to know which media to be activated with which slide. In step 5, the customer or the student group name is to be added to the text file (GeneralCustomerList). The logo is to be added to the directory (04-Logos).

The last five steps are required to make the material ready for the software to assemble a seminar. In step 6, at the time of activating the software, it reads the whole text files in the seminar database, so that it can be used to assemble the seminar form the previously prepared material. This will be discussed in the following sections

USER INTERFACE

The software is optimized to fit in full screen in case if LCD projector of 600x800 standard resolution is used. As shown in Fig.2, the user interface consists of one window with various tabs (1) to manage the seminar building and delivery. On the left side slider bar (2) is used to move between the slides forward and backward with the current page number (3) appearing on top of it.

A tool bar (4) to choose pen color and slider bar (5) to change the pen thickness are added to be used for underlining or deleting any part of the presented slide by moving the mouse over the presentation area while holding "left" key down.
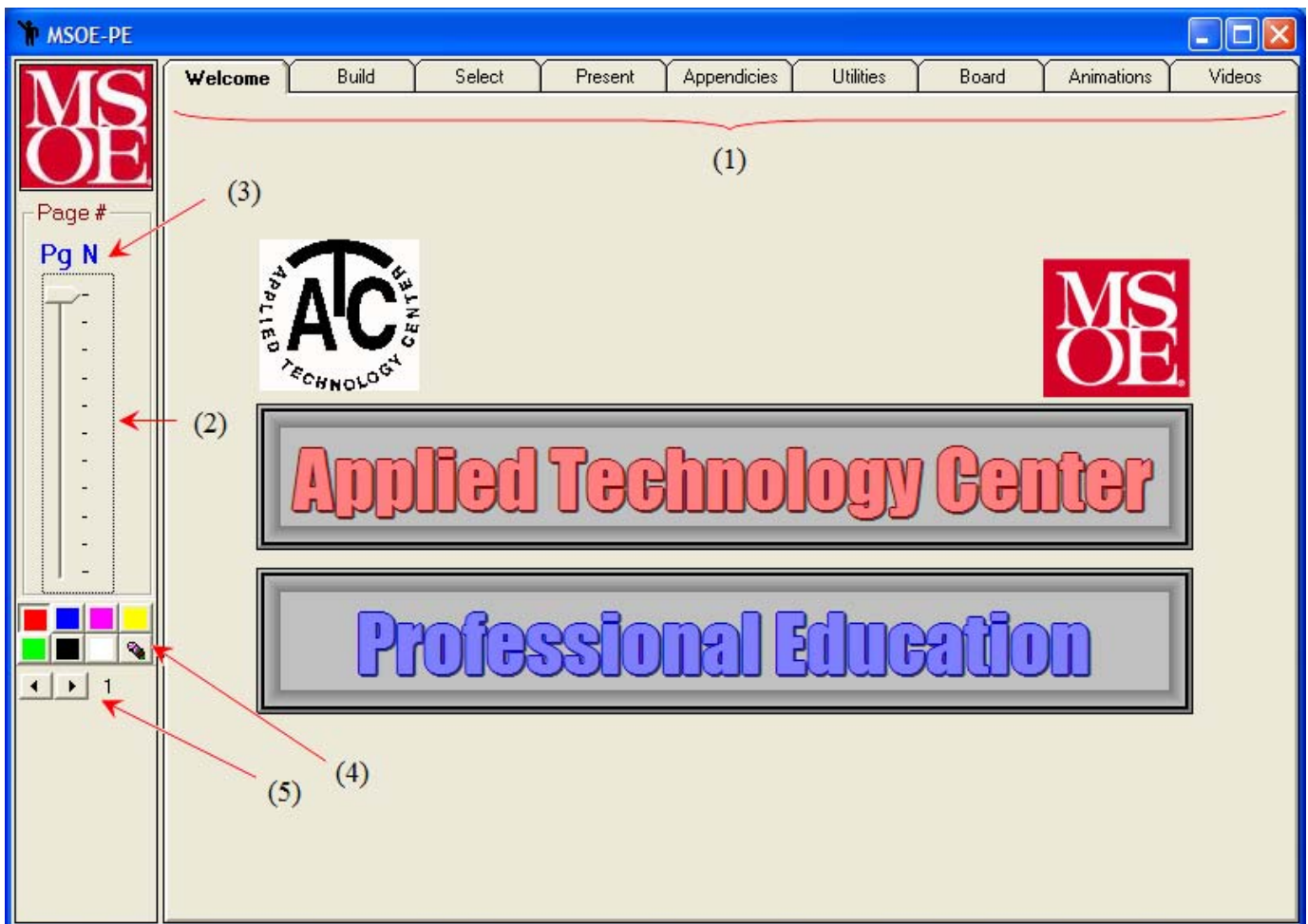

Fig.2 User Interface

CUSTOM SEMINAR BUILDER

The "Build" tab, shown in Fig.3, is designed to help the instructor to custom build seminars based on the customer needs. Steps for doing that are as follows. First step is to select the customer or group name for which this seminar will be constructed. Customer names will be grabbed from the relevant text file in the seminar database as we explained previously. Second, the chapters from which the seminar will be built are to be selected. The left hand side list is the pool that contains the names of all the chapters that have been built in advance. Chapter selection is to be done by moving it from the left hand side list to the right hand side list.

A set of arrow keys is added to help selecting or removing chapters and reordering them as per the instructor desire. With each chapter selection, the seminar total time is updated as shown below the selection list.

Third step is to preview the seminar information before saving it. By pressing the "Seminar Preview" button, a notepad file will be generated to show the seminar information. As shown in Fig.4, seminar information contains the institution name, department, customer name, selected chapters and the total seminar delivery time. Further work is now under development in order to add to the seminar information the seminar objective based on the selected chapters.
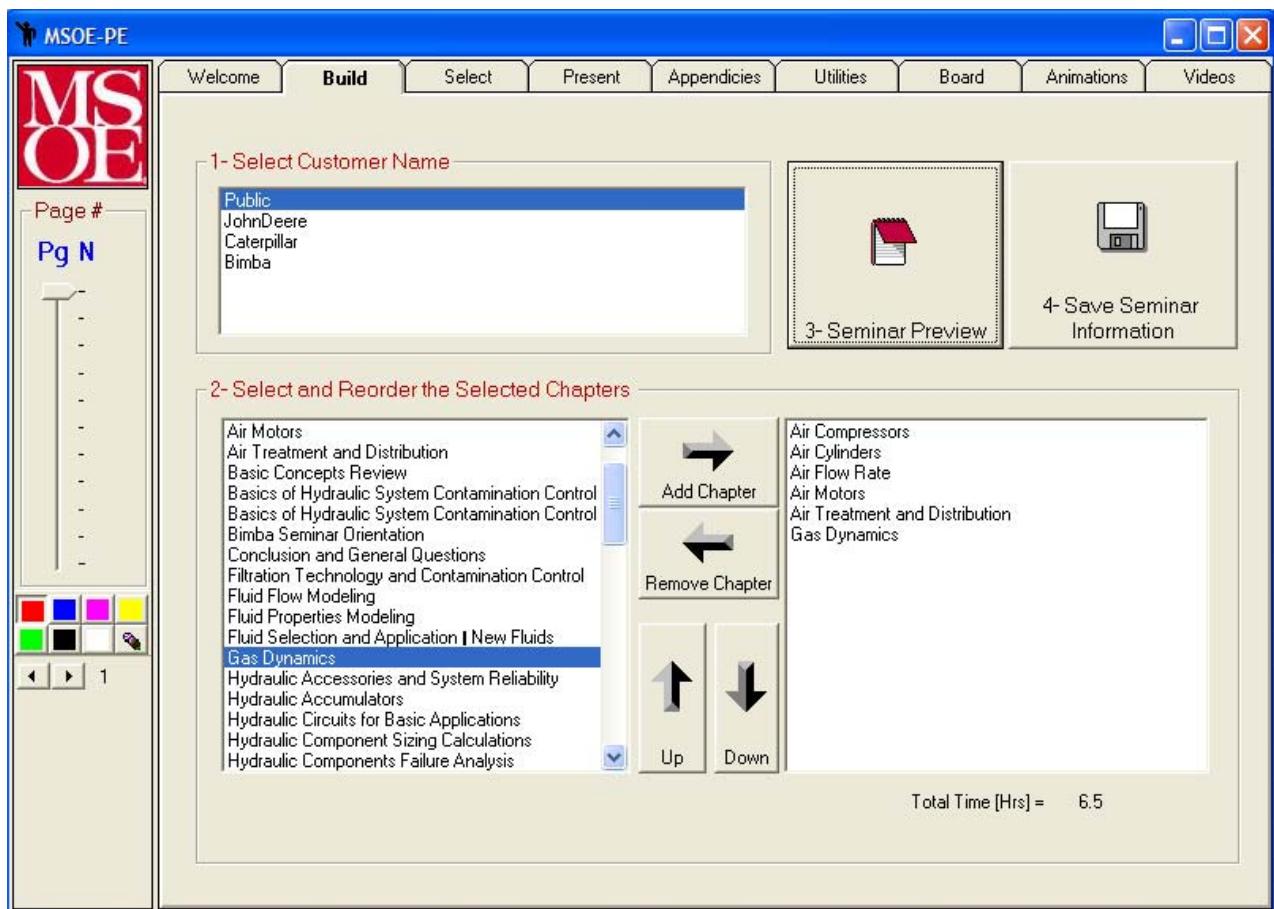

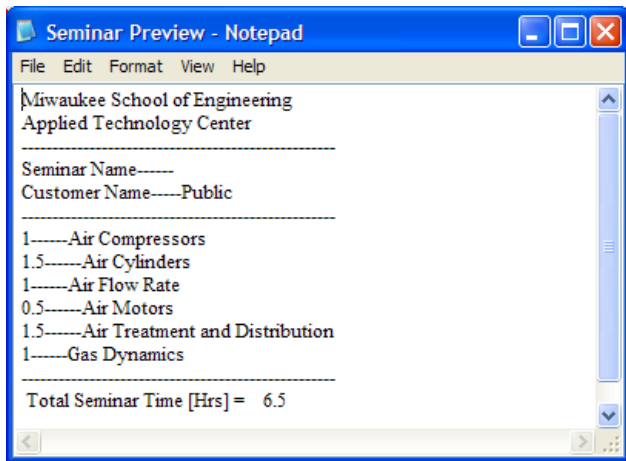**Fig.3** Custom Seminar Building

Fig.4 Seminar Preview Report

Last step is to save your seminar. By pressing the button number 4, a standard Microsoft window for saving file will pop up as shown in Fig.5. Previously saved seminars files of ".PES" extension will appear. The instructor then will have the choice to replace any of the previously saved file with a new name or to save the seminar as a new one with a new name.

The seminar that has the information shown in Fig.4 will be saved with a name "Sample" and will be used for further explanation. The seminar "Sample" is now ready for delivery.

In the following section, the tool for seminar delivery will be explained; activating the multimedia and controlling the seminar progress and time management will be discussed.
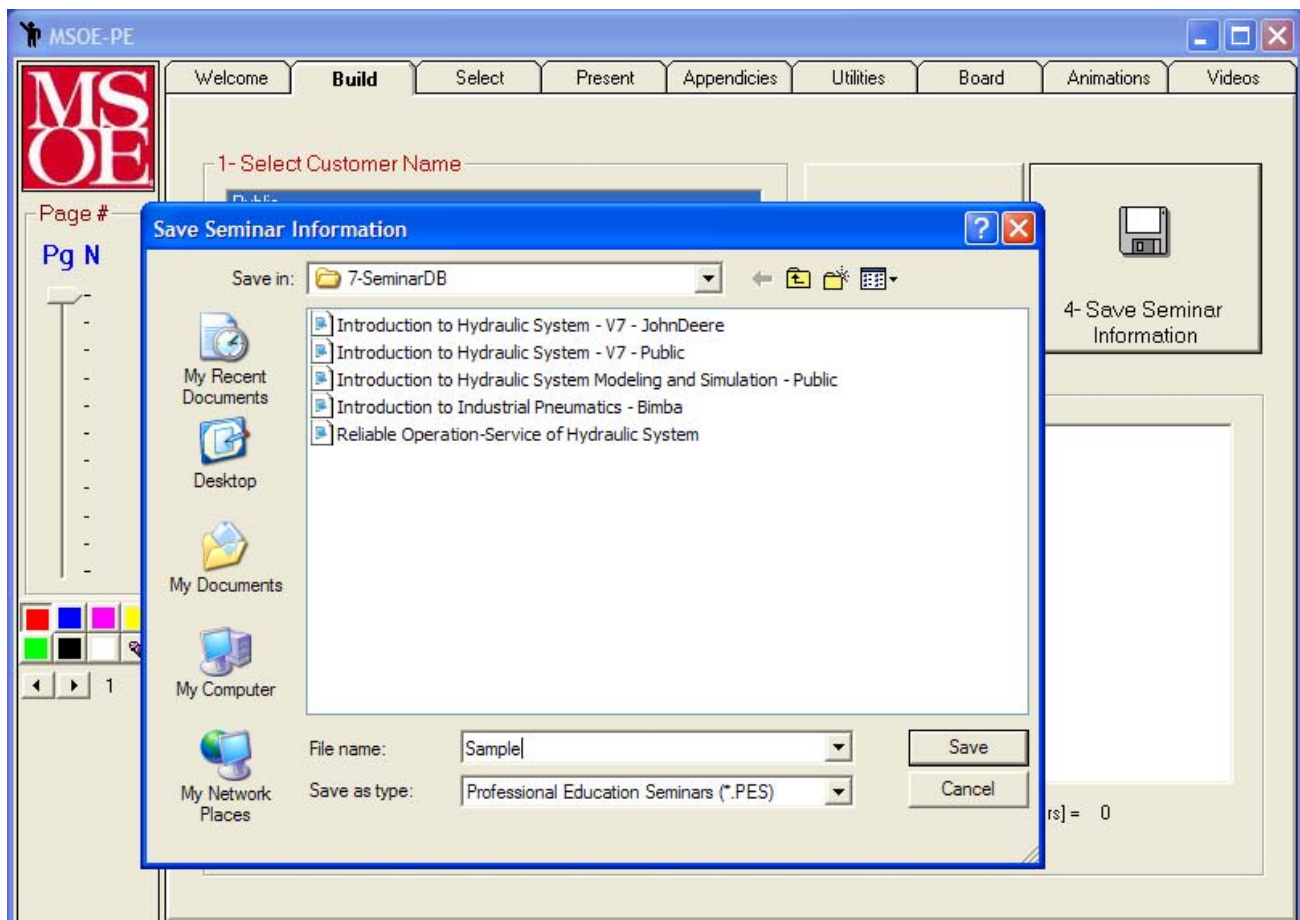

Fig.5 Seminar Saving

ARCHIVED SEMINARS SELECTOR

To select a seminar for delivery, press the "Select" tab shown in Fig.6, then press "Select Seminar" that will open a Microsoft standard opening file window to choose from as shown in Fig.7.

Any of the archived seminars can be opened by double-clicking on it or select it and press "Open" button in Fig.7. By selecting the "Sample" seminar, which we have built in the previous section, you will see the chapters from which this seminar is constructed as shown in Fig.6. Once the seminar is selected, its name can be seen on the top border of the window.
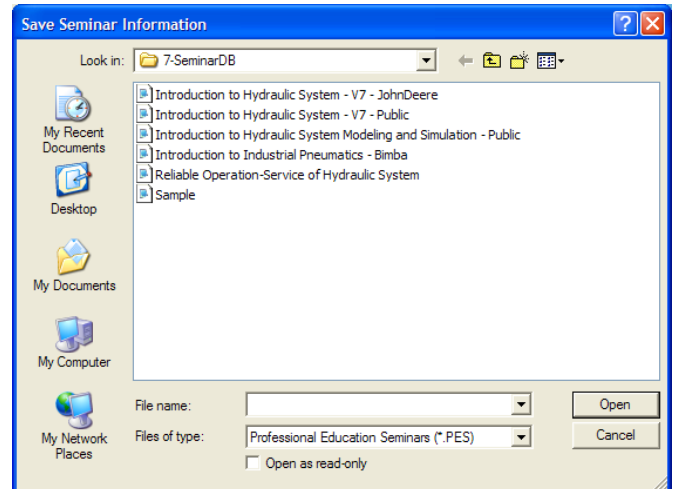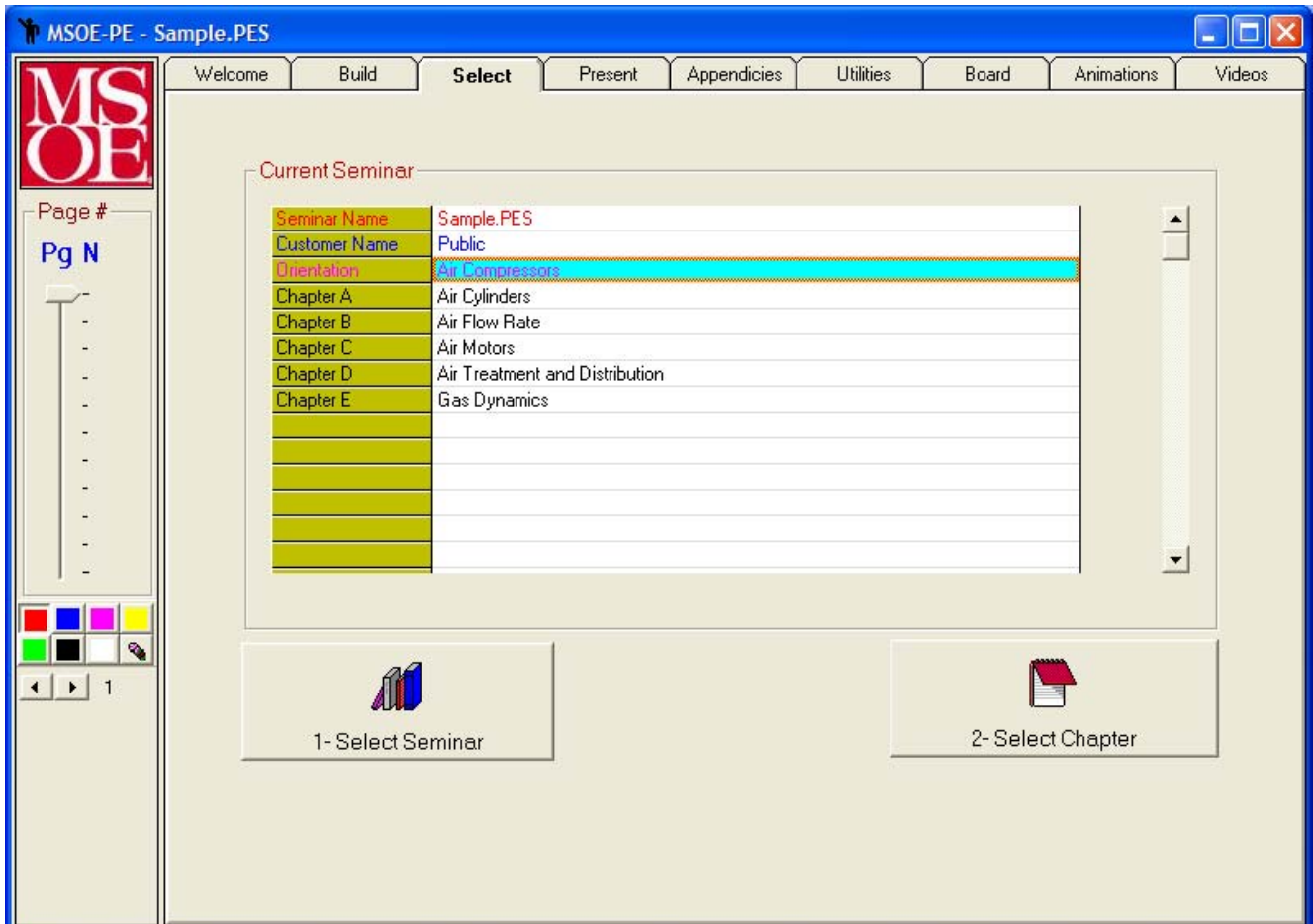

Fig.7 Archived Seminar Selector

Fig.6 Chapter Selection

SEMINAR DELIVERY

Now the seminar is ready for the delivery and the instructor is free to choose any of the chapters included in the list to start with as shown in Fig.6. Any chapter can be selected by following the same standard way like double-clicking on the required chapter or select it and press "Select Chapter" button shown in Fig.6.

Once a chapter is opened, the software will automatically move to the "Present" tab and start with the slide number zero out of total pages in this chapter. Slide number zero is recommended to contain the chapter name, as shown in Fig.8. The instructor can use the keyboard arrow keys or the scroll bar on the left side to move from one slide to other up and down.

INSTRUCTOR UTILITIES

A number of utilities are available to help the instructor to efficiently present the material. More utilities are under development. In the following section, some of the utilities will be explained.

As shown in Fig.8, on the left side of the presentation area below the scroll bar, a number of colored buttons and horizontal scroll bar to select line color and thickness respectively. Using such utility, the instructor will be able to draw lines on the presentation area using the mouse like in case of Power Point software. The button before the last is to erase any portion of the presentation area. The last button is to erase all the drawn line and keep only the original slide. White board is added and accessible by pressing the "Board" tab
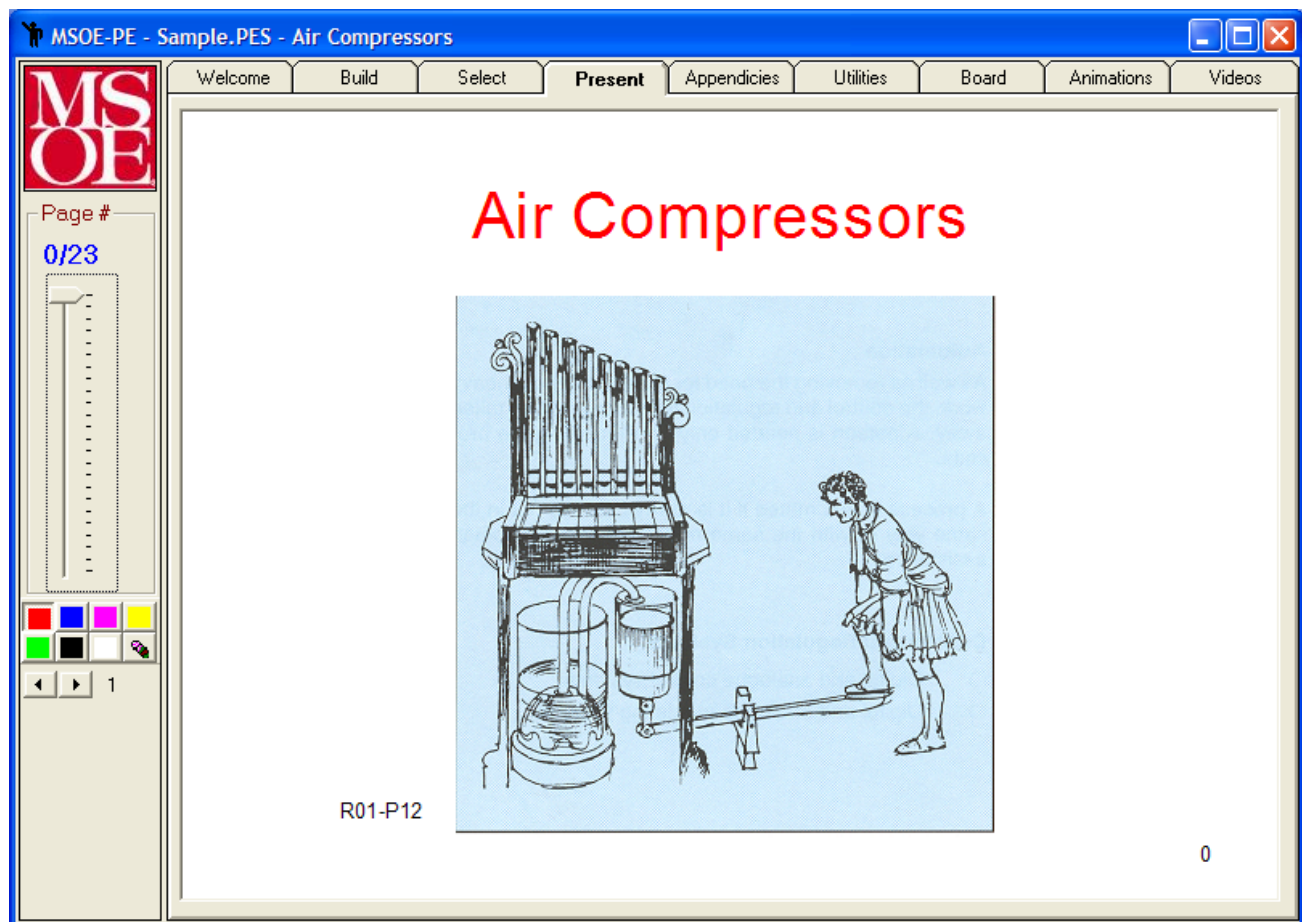

Fig.8 Seminar Delivery

At any time of the seminar delivery, the instructor can press on the "Animation" tab or the "Video" tab to activate any of the previously saved media as shown in Fig.9 and Fig.10, respectively. On each tab there is a list of media names to choose from. This list of media names are added to the seminar database independently. On each tab there is a tool bar to help the instructor to activate the media in an auto play mode, stop it and move it frame by frame backward or forward.   As shown in Fig.11, by pressing the "Utilities" tab, the instructor can access three frames of utilities.
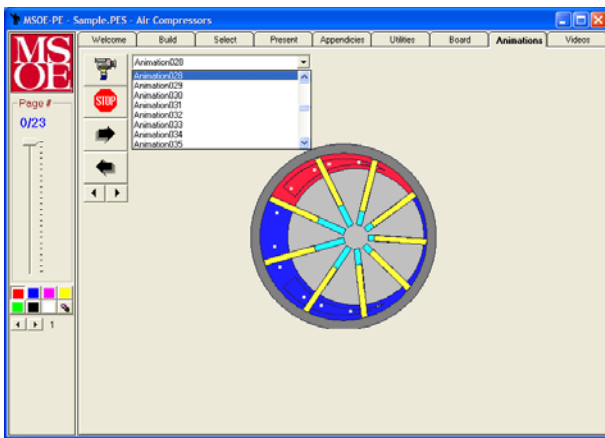
A time management function is available on the left frame to help the instructor to adjust the delivery time. By pressing the "Start" button, the elapsed time shown on the left yellow box is activated and compared with session time set and shown on the right yellow box. When the set expire, the instructor will get a reminder bell sound that can be stopped by pressing the "Stop" button. The Microsoft calculator and shareware units converter applications are accessed by pressing the relevant button in the middle frame. The right frame is reserved for changing the whole seminar slides from English to SI system of units.

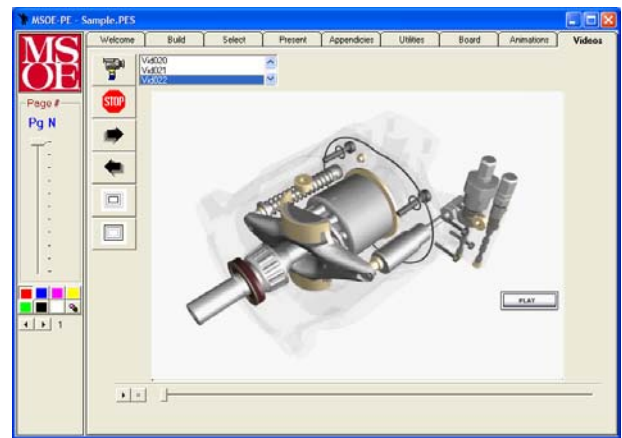

Fig.9 Animation Activation
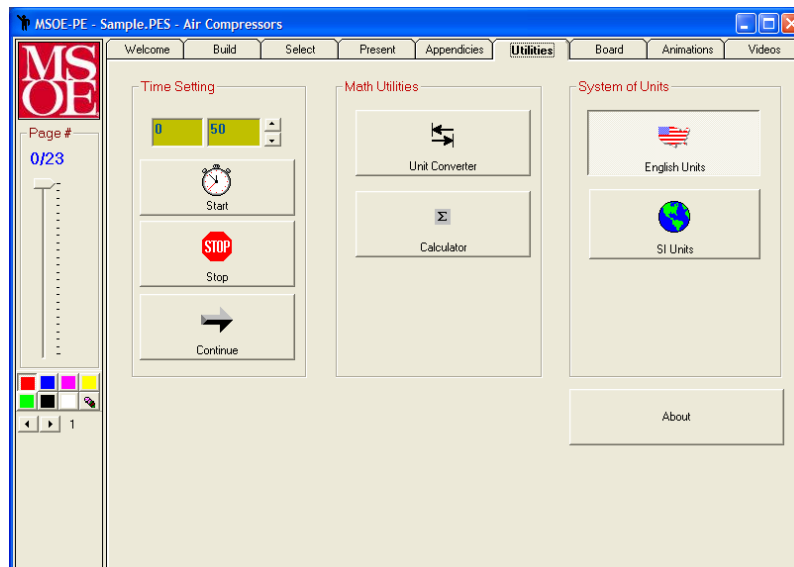

Fig.10 Video Clip Activation

Fig.11 Other Instructor Utilities

CONCLUSION

MSOEPE Seminar Builder is software designed basically to efficiently build and maintain both customized seminars for specific group and general seminars for the public. Time saving and controlling various teaching material are among other various benefits using such software. In this stage of the software development, it contains the basic functions of building seminars, selection from previously built seminars for delivery, multimedia activation and some instructor utility.

Such software can be used on any institution level rather than just individual level. Common database on the institution server can be used to collect all the educational material developed by all the faculty of the institution. If this database made accessible for the institutions faculty, they can use the software to build their seminars quickly and easily.

Further work is in progress now in order to increase the functionality of the software. Objective of the new development is to offer the instructor more utilities to use and add flexibility in building their seminars and delivering it.

This software could be used by other universities and educational institutions in general. It can be setup on a network server so that all the instructors within the institution can access it. This technique can be used to form one pool of educational material ready for delivery from any computer connected to the network within the institution. Some training, cost and copyright arrangement should be negotiated with the developer.

Curriculum Vitae

Dr. Medhat K. Khalil: is a professional education instructor in fluid power and motion control at Milwaukee School of Engineering, Milwaukee, WI. He has a bachelor's degree in mechanical engineering and a master's degree in fluid power engineering from Military Technical College and Cairo University, respectively, of Cairo, Egypt. He earned his Ph.D. in mechanical engineering from Concordia University, Montreal, Canada. Dr. Khalil has more than 20 years of balanced experience between work for the industry, academic education and professional education. He has a special interest in developing software innovative tools for engineering education.

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