Teaching ECDIS by Camtasia Studio: Making the Content more Engaging

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ABSTRACT: The basic idea of this paper is to motivate teachers/instructors of maritime schools and colleges to create interesting and engaging screencasts for teaching students (future seafarers) ECDIS basis, by using new contemporary media and didactical solutions. Camtasia Studio has been proposed as suitable applied software for doing so. It is a multi-media, user-friendly environment, providing the customers with the variety of possibilities for editing PowerPoint presentations with the introduction of audio, video and different animations, in order to make teaching/learning content more interesting and to point out the most important issues. It allows computer screen video capturing, and adding of audio and numerous animated effects to it, as well as augmenting video recordings into the Camtasia project(s). Even though the proposed software tool possesses a broad palette of advanced features for recording and editing "lively" and edifying recordings, within this paper only brief descriptions of "reviving" classical PowerPoint presentations, taking the screen captures over Transas demo ECDIS software, and their editing is presented. Several examples of instructional recordings concerning ECDIS operational basis, and possibility of students' self-evaluation have been given, too.

1 INTRODUCTION

Contemporary sophisticated navigation equipment requires permanent rising the quality of teaching/learning level(s) at MET (Maritime Education and Training) institutions. Students, future seafarers, should have available resources in order to learn more: quickly and easily. It should be borne in mind that students are increasingly exposed to the dual pressure nowadays, i.e. most of them have to study and work at the same time. Offering them e- or blended learning materials is a kind of relief. On the software market there are a lot of new media tools that are available to teachers for creating e-learning educational/training materials. Some of them are free, which is an additional benefit. By exchanging experiences and through persistent experimentation,

teachers can relatively easy create instructional materials that will encourage students to learn, in parallel with greatly facilitating their cognitive processes and acquiring new knowledge and skills.

Often, the prevailing students' motivation factor for choosing the profession of seafarer has been the income. Following this motif, seafarers (e.g. from Montenegro and the entire region) have been employed by mainly bad companies. This practice is to be gradually changed. With improved education, the students would become competent for finding employment in better and more successful companies investing in their staff and their professional training. This would create a new "class" of experienced seafarers, who could later take part in education and raise its quality to an enviable level. In other words,

by introducing students to the space which facilitate easy acquisition of even theoretical knowledge, and getting more quickly competencies of considerably higher level, the previous mentioned should be slightly change in the future. To this end, the paper presents a few ideas on how to teach, and consequently easier learn basics of ECDIS (Electronic Chart Display and Information System) on the exemplar of Camtasia Studio software tool employment at METs in more efficient knowledge transfer.

The paper is organized in the following way: (a) A short description of ECDIS is given in order to emphasize its importance in providing safe and effective maritime navigation; (b) An overview on software tools that can be used in creating more interesting and engaging educational materials is given, with a particular emphasize on Camtasia Studio being used here; (c) Several examples of using Camtasia Studio in teaching/learning ECDIS are given, and (d) Some conclusion remarks, along with the directions for further research work in this field are given, as well.

2 ECDIS: AS A CONTENT OF THE INSTRUCTIONAL MATERIALS

The ECDIS is an entirely electronically based navigation system that integrates real-time navigational data from ship sensors (GPS, Radar, AIS, etc.) and electronic navigational charts (ENCs - Electronic Nautical Charts) [17;18]. In its very nature, it is a centralizing instrument with the unique function of integrating many aspects of navigation [15]. More explicitly, it allows the integration of numerous operational data, such as ship's course and speed, depth soundings, and radar data into the display. Furthermore, it allows automation of alarm systems to alert the navigator of potentially dangerous situations, and gives him/her a complete picture of the instantaneous situation of the vessel and all charted dangers in the area [9]. ECDIS has been conceived in such a way to support and enforce the transition to the e-Navigation concept [17].

Although the International Maritime Organization (IMO) officially approved it as the equivalent to the classical paper charts in November 1995 [9], the transition to its full usage in practical maritime navigation is still slow. The causes are the lack of the official ENCs, the high cost of ECDIS, and a dose of skepticism in accepting this new technology by the traditional marine community. However, ECDIS has benefits in terms of time saving in route planning and monitoring, preventing accidents and thus protecting the ship and marine environment. ECDIS functions can be used effectively especially in restrictive waterway areas, during periods of poor visibility, i.e. under conditions of mist and during the night. In coastal waters it is generally very easy to derive the position with the view from the bridge windows, as well as with the information from other prime navigational devices. But, care must be taken to ensure that radar is always used as the primary collision avoidance aid and ECDIS as the primary charting aid [18].

The key components of ECDIS display, i.e. most of the visualized commands of ECDIS (on the exemplar of Navi-Trainer Professional NTPro 4000 nautical simulator manufactured by the Transas Marine) have been described in detail within some previously published papers by the author in this field and cited in [1]. Also, the basic and some advance features of ECDIS have been covered by numerous referential literature resources, e.g. like [9-17;20-22;25-31]. Though, the focus will be given here on using new media tools in better teaching/learning ECDIS principles.

3 CAMTASIA STUDIO: AS A TOOL FOR CREATING THE INSTRUCTIONAL MATERIALS

Nowadays there is a quite large offer of different application software which can be used for producing:

– **audio** (Audacity, NCH Wave Pod, Adobe Audition, Cubase Steinberg, Logic Studio, Kristal Audio Engine, etc);
– **video** (Windows Movie Maker, Adobe Premiere, Avidemux, Magix Video, Video Spin, AVIedit, etc); and,
– **sreencapturing** (Adobe Capticate, Capture Fox, Camtasia Studio, Jing, ActivePresenter, BB Flashback, BB Flashback Express, ScreenPresso, VirtualDub, etc).

Web can be used, of course, as a resource for further search in the field [32;33].

Some of these software tools are proprietary commercial, while some are freeware. And it is difficult to give the recommendation which one should be used. Exploring *pros* and *cons* of these and numerous other software is beyond the scope of this article. However, at this moment of the authors' work in this domain, the most appropriate *seems* here employed and briefly presented Camtasia Studio software. However, this does not mean that the teachers/educators at METs should not experiment with other tools, and that the authors will not do so, what should undoubtedly create new opportunities for exchanging and mutual enriching experiences in this MET sphere in the future.

Hence, the following part of this section will provide the reader with some basic Camtasia Studio features. Camtasia Studio is a set of software applications for creating professional-looking presentations, video tutorials and/or screen captures, published by TechSmith [23]. It allows: creating professional videos easily, recording on-screen activity, customizing and editing content, adding interactive elements, and sharing videos with anyone, on nearly any device.

More precisely, the PowerPoint presentation recordings along with a variety of animated effects, the narrator's voice, background sounds (music), and web camera recordings of the presenter are enabled by this software. Additionally, the whole screen, or the exact pre-specified screen area (of any PC program, or, here the ECDIS Transas demo version) can be captured, and audio may be recorded simultaneously, or embedded latter, from any

standard input source device. During the content production the presenter is able to *jump* from one application to another without interrupting the recording process. The presenter is able to stop recording with a hotkey combination at any time, at which point the software renders the input that has been captured, and applies user-defined settings. After the presentation had been captured, it is possible to revise it by cutting and/or pasting different parts, as needed.

The presenter is also able to overlay the voice sequences, sound effects or music onto the presentation, if it is needed. Camtasia allows audio recording while screen-capturing is in progress, so the presenter can narrate the demonstration as it is carried out. Most presenters, however, prefer to wait until they have finished the screen-capture, and then record the narration from a script as the application is playing back the recorded capture. The program allows files to be stored in its own proprietary format, which is only readable by Camtasia itself; this format allows fairly small file sizes as well as longer presentations [23;24].

The completed video recordings can be also output to several different, popular common (video) file formats, such as AVI, Flash, SWF, Quick Time, RealMedia, etc., which can be easily read by most computers. Camtasia Studio can be used for quickly recording, editing and submitting variety of contents in variety of manners.

Within this context of learning ECDIS fundamentals, and some of its advanced functions – more efficient knowledge transfer and its acquisition by the students, particularly future seafarers among them, it is Camtasia Studio primary task.

4 ON RECORDING POWERPOINT PRESENTATIONS ABOUT ECDIS BASIS

In general, recording PowerPoint presentations should be realized in two ways: recordings can be done directly from PowerPoint by using Camtasia Studio PowerPoint Add-in tool, or by saving each PowerPoint presentation slide in JPEG format, and importing them into the Camtasia Studio Clip Bin, and latter on, transferring them sequentially to the Timeline. Then, the JPEG files can be edited by associating them with voice narration, web camera recordings, different animated and transitioning effects, etc. The detail description on both procedures can be found in [23]. In introducing students with the ECDIS basis: historical facts, standards, types of navigational charts, performances, educational-training requirements, etc., both ways of PowerPoint recording have been applied by the authors. Also, the authors have realized some experiments with Web camera and inserted recordings into the video as Picture-in-Picture (PIP) augmentation, what makes the presentations more interesting and engaging for the students. Due to the voice narration, background sounding, and web camera recordings, along with the different animations, above listed topics became undoubtedly more interesting; firstly, in terms of keeping up students' attention and most probably,

making them curios to learn more on this topic in the perspective.

Undoubtedly, it is more interesting and "lively" to present some examples of using Camtasia Studio in recording screen captures over ECDIS Transas demo software. Thus, in the following section some of these examples will be presented and briefly explained.

5 ON RECORDING THE SCREEN CAPTURES OVER EDCIS SOFTWARE

In the process of recording screen captures on ECDIS, the Transas demo version 2.00.012 (2010) has been used as a base upon which the recordings are done. The whole screen is recorded, along with the presenter narration, and after the recording had been finished, the capture is imported to the Camtasia Studio and edited. Different animated effects (callouts, captions, smart-focus tools: zoom, pan, etc.) are added, in order to make the captures more interesting, and ultimately more edifying to students. Although, all necessary details on screen recording, audio adding, and editing the recordings can be found in [23] – it is on a presenter, here teacher/instructor, to optimally allocate the place and duration of each animated effect within the presentation, aiming to make engaging and really worth audio/video record, prepared to be shared among students, colleges, and/or wider, e.g. Web audience.

Some screencasts which present the process of capturing the screen and editing the screen captures taken over ECDIS demo version software are given below (Fig. 1-5).

Example 1: The main object of the screen shot shown in Fig. 1, along with the voice narration of the presenter, was the route creating graphically, and scheduling it by entering ETD (Estimated Time of Departure) and ETA (Estimated Time of Arrival). The process of route saving (for later reference and potential output to the autopilot), along with the possibility of deleting some of its segments, or inserting new ones has been presented. The possibility of waypoints' parameter tracking in the control panel from the route data sub-window has been explained, as well, and it is marked on the screen (Fig. 1) as an important segment of ECDIS route monitoring. Within this context of route planning it is to be pointed that the operator should control the route parameters related to the alarms and indicators, like [9]:

- Cross-track error: set the distance to either side of the track the vessel can stay before an alarm sounds. This will depend on the phase of navigation, weather and traffic;
- Safety contour: set the depth contour line which will alert the navigator that the vessel is approaching shallow water;
- Course deviation: set the number of degrees off course the vessel's heading should be allowed to stray before an alarm sounds;
- Critical point approach: set the distance before approaching each waypoint or other critical point that an alarm will sound;

– Datum: set the datum of the positioning system to the datum of the chart, if different, etc.

Because of the demo version of ECDIS by means of which the Camtasia Studio presentation features have been applied in this work, there are certain limitations in setting on the critical values of the above listed parameters by the user, though for the purpose of continuing to meet the students with the functions of ECDIS, the real ECDIS simulator should be necessarily used (e.g. Navi-Trainer Professional NTPro 4000 nautical simulator, or an advanced version).

Figure 1. Route planning procedure

Example 2: Here, the process of acquisition of the AIS (Automatic Identification System) target data (in manual, not in random mode in here employed ECDIS demo version) has been also shown in the short video presentation (Fig. 2). For the purpose of making AIS targets visible and selecting one of them, the AIS overlay command button must be pressed in the command panel in the upper right corner of the display. In the simulation panel the random button has to be switched off and certain available AIS target is to be selected and enabled. Its position can be controlled by inserting manually its coordinates and course, or by cursor, i.e. by positioning it directly at the proper place, along with the direction onto the chart panel. These options are zoom in by zoom and pad (zoom-n-pan) Camtasia Studio tool, and marked in red by the callouts in Fig. 2.
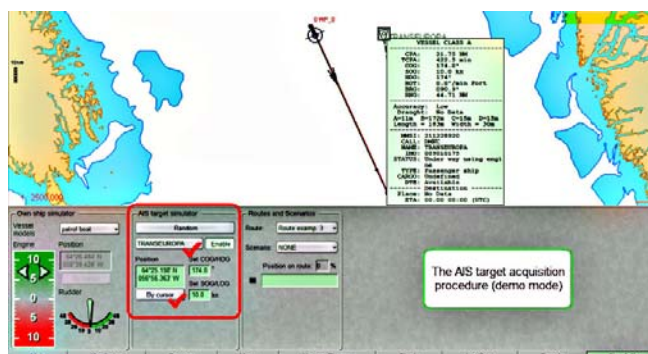

Figure 2. AIS target acquisition

Example 3: In the Fig. 3 the imitation of the chart update procedure is outlined. The ECDIS operator has to find the available update of certain chart in Chart functional panel and to upload it into the system, i.e. to replace the old chart by the new one. The updates are marked in orange (in here used demo ECDIS version) in the new chart version, and the renewed data can be seen for each marked object in the updated chart, simply, by clicking the info button. It is to be mentioned that each vessel should have up-to-date charts for safe navigation. That is the requirement of SOLAS Convention regulationV/27. Updates can be manual or official (automatic or semiautomatic). The manual update is used for navigational warnings sent as MSI (Maritime Safety Information) by NAVTEX, or EGC (Exchange Group Call). Official updates are distributed by RENCs (Regional Electronic Navigational Chart Coordinating Center) throughout the update discs [17].
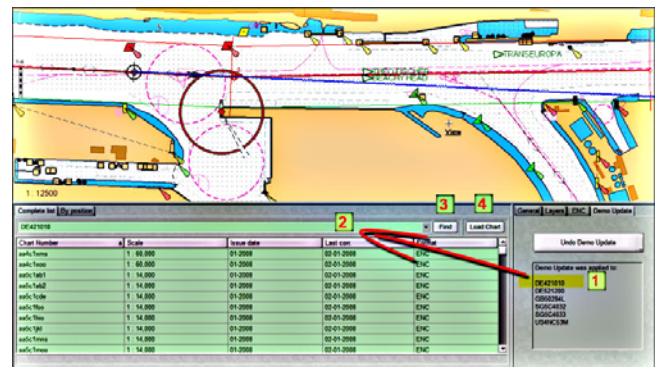

Figure 3. Imitating charts updating procedure

Example 4: In the Fig. 4 and 5, is graphically presented the principle of checking primary (acquired by GPS) and secondary (acquired by referential object at the coast) position of the ship. Through such "picturesque" presentation it becomes clearer, i.e. more understandable to the students how they can realize this very important procedure of checking the position. Of course, the variations in manus and options are present from one to another version of ECDIS software, but the very basic idea of this common officer on watch action is similar.
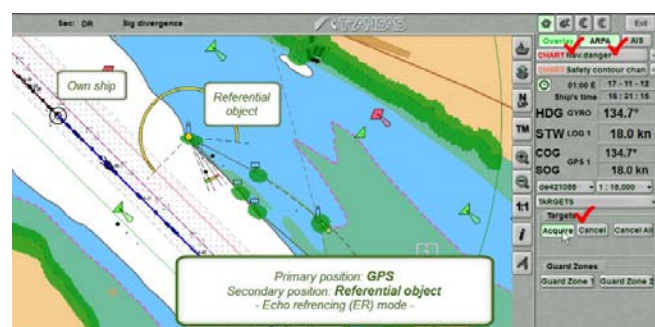

Figure 4. Comparing primary and secondary position: GPS vs. referential object position on the coast
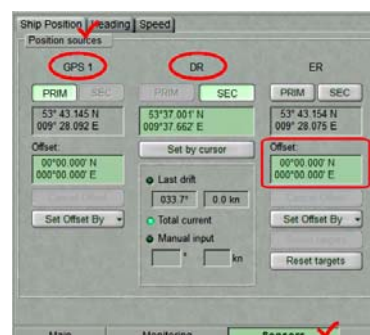

Figure 5. Comparing primary and secondary position: offset checking

It is to be pointed out once again that by using the available preset scenarios in ECDIS Transas demo version 2.00.012 (2010) the ARPA overlay and the NAVTEX messages observing are available, as well as the possibility of imitating chart updating procedure. However, since the demo version of ECDIS is in matter, these options are available only for some preset route scenarios, but not in the free route planning mode. Of course, these and others, rather numerous restrictions, as those related to some relevant route parameters tracking (cross-track error, safety contour, course deviation, critical point approach, etc.) should be overcome by using *real* ECDIS simulator, or through underway exercise sequences on real ECDIS [14;15], as the sound and confident platforms for recording, editing, and post-producing educational/training videos by new media equipment and software tools devoted to providing more efficient knowledge transfer in this domain.

Though, such approach might be a challenge for forthcoming, more extensive and rigorous investigation work in this field. Also, instead of Camtasia Studio, some other applied software can be applied, e.g. Adobe Premiere, since it offers some advanced possibilities of video recording, editing and post-producing educational materials of higher quality.

6 TOWARD ACHIEVING BETTER INTERACTIVITY

The reader may get the impression that Camtasia Studio does not provide enough space to interact with the students. But still, there is a way that this lack of interactive dimension can "catch up", and that is through the creation of self-evaluation tests for students. With the intention to approach the procedural level in Camtasia Studio for creating self-evaluation tests, then it is to begin by using the options (Camtasia Studio ver.7): Tools => Quizzing ... => Add quiz ..., and then the options Move => Quizzing ..., are to be consulted. Tests may include the questions of the following types:

– Multiple choice;
– Fill in the blank; and,
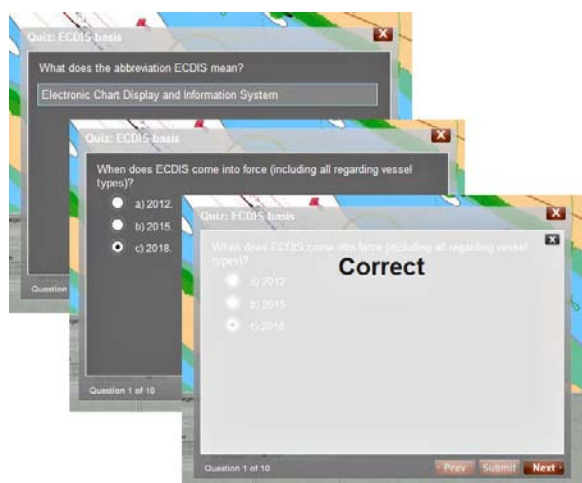– Short answer (which is not scored).

Figure 6. An example of Camtasia Studio quiz on ECDIS basis

Within one quiz, or self-evaluation test all these types of questions may be included and combined in different ways, depending of the instructional material and the teacher's conceive of that how the test should be. Immediately after answering the question the students can get the score, and though check their knowledge about the topic(s). In Fig. 6 is given an example of self evaluation test (segments) with multiple choices and fill in blank options of providing answers, along with the form in which the students can see the score.

7 SOME GENERAL RECOMMENDATIONS

What should be treated as general recommendations for recording and editing engaging ECDIS learning captures? - Regardless of the content of the presentation, the answer is almost the same [19]. First of all, the presenter must have a good knowledge of the area which he/she presents. Additionally, he/she should be well prepared in a sense of having very clear idea about what, in what extent, and in which order it is to be said. The presentation should be clear and concise. And, the presenter should not be "in rush", at all, during the narration/explanation phase(s). Leaving some *free* or *silence* sequences is recommended, as well. The following animated effects should be of the appropriate length, and given in the appropriate amount. Students should be allowed to hear and understand what the presentation is about.

Since teaching/learning ECDIS is a very important issue, which directly touches the fully electronic integration of almost all vital navigational equipment and acquisition of the information that they provide, which ultimately implies the safety of navigation – these particularly reinforce previously given, rather general, suggestions.

8 CONCLUSIONS

The paper contains short description of ECDIS and its importance to the safe navigation, as it is previously mentioned, in terms of recalling the author's previous published papers referred in [1] and some well-known references in this field [9-17;20-22;25-31]. An emphasis is put on introducing contemporary methods and techniques into the process of learning students of maritime schools and colleges ECDIS principles and operational basis. Consequently, Camtasia Studio applied software has been recommended as a quite suitable tool by the authors, and briefly presented in order to draw the attention of teachers and instructors at METs in a manner how to make their lectures more interesting and engaging for students. The engagement of students is of crucial importance of the appropriate acquiring of the knowledge. Besides Camtasia Studio, many new technological solutions are available on the software market for educators to create a kind of alternative learning environment in which students learning should be expanded and reinforced [19]. Learning ECDIS by involving advanced media tools, such as Camtasia Studio, should be undoubtedly an

interesting platform for developing more stimulating learning environment, and new active knowledge transfer (tele)channels between educators/trainers and students and/or trainees in the field of electronic navigation and in another fields, as well.

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