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Effectiveness of a Manual in the NACOS Platinum ECDIS

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Abstract

As officer reenters a position in their working field the familiarization with the equipment, particularly the ECDIS, on board is an obstacle to face. Especially, when working and vacation periods are long, knowledge for the equipment fades. Therefore, the obstacle of the familiarization with the NACOS Platinum ECDIS, an important tool on board should be effortless.
The purpose of this thesis was to see if and how a manual improves the effectiveness for officers in the NACOS Platinum ECDIS. Unlike manuals provided by the manufacturer this manual was created to serve as a quick guide for fast pace occurring tasks. Therefore, being particularly useful for the officer when reentering their work position.
In the research part of this thesis a hybrid was used between an experiment and a questionnaire for the participants.

Language: English
Key Words: NACOS Platinum ECDIS, Manual, Quick Guide

EXAMENSARBETE

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Utbildning och ort: Sjökapten, Åbo
Handledare: Tony Karlsson

Titel: Effektiviteten av en manual i NACOS Platinum ECDIS

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Abstrakt

När officeren återinträder i sin position inom sitt arbetsfält kan bekantskapen med utrustningen, särskilt ECDIS, vara en utmaning. Speciellt när arbets- och semesterperioder är långa, bleknar kunskapen om utrustningen. Därför bör hindret för bekantskapen med NACOS Platinum ECDIS, som är ett viktigt verktyg ombord, vara okomplicerat.
Syftet med detta examensarbete var att se om och hur en manual förbättrar effektiviteten för officerare i NACOS Platinum ECDIS. Till skillnad från manualer som tillhandahålls av tillverkaren skapades denna manual för att fungera som en snabbguide för snabba uppkommande uppgifter. Därför är det särskilt användbart för officeren som återinträder i sin arbetsposition.
I forskningsdelen av detta examensarbete användes en hybrid mellan ett experiment och ett frågeformulär för deltagarna.

Språk: Engelska
Nyckelord: NACOS Platinum ECDIS, Manual, Snabbguide

OPINNÄYTETYÖ

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Nimike: Käyttöohjeen tehokkuus NACOS Platinum ECDIS:ssä

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Tiivistelmä

Kun upseeri palaa työhönsä omalle alalleen, laivassa olevien laitteiden käyttämisen muistaminen, erityisesti ECDIS:n, on haastavaa. Varsinkin koska työ- ja loma-ajat ovat pitkiä, voi unohtua, miten laitteita käytetään. Siksi NACOS Platinum ECDIS -järjestelmän, joka on tärkeä työkalu aluksella, muistamisen kynnys pitäisi olla matala.
Tämän opinnäytetyön tarkoituksena oli nähdä, voiko käsikirja parantaa upseerien tehokkuutta NACOS Platinum ECDIS:ssä. Toisin kuin valmistajan käyttöohjeet, tämä käsikirja on luotu toimimaan pikaoppaana nopeatempoisissa tehtävissä. Siksi se on erityisen hyödyllinen upseerille palatessaan työasemaansa.
Tämän opinnäytetyön tutkimusosassa käytettiin kokeen ja kokeeseen osallistujille tarkoitetun kyselyn yhdistelmää.

Kieli: Englanti
Avainsanat: NACOS Platinum ECDIS, Käyttöohje, Pikaopas

Table of Contents

1 Introduction

As new officers start to work on board cruises companies a mandatory factor is first an overall familiarisation which needs to be completed before attending the first watch. This familiarisation contains general ship specifics knowledge which needs to be finished with the staff captain on board the vessel.

Secondly an in-depth familiarisation of the ECDIS Platinum needs to be completed at least 14 days after signing on. This is required by the company's quality management. The familiarisation will later on be verified by the staff captain onboard. Officers who fail to conclude these familiarisations will be dismissed from the vessel.

To prevent the dismissal, it was necessary to create a guide which helps new and returning officers to quickly navigate throughout the ECDIS Platinum. A guide could be created in form of a manual to help new officers to adjust for the familiarisation.

Following after that conclusion it should be researched if this created manual has an impact on the performance of the officer. Resulting in the question if the created manual operates effectively as a quick guide for officers to the NACOS Platinum ECDIS.

1.1 Aim

Following after the conclusion that a guide was needed for the NACOS Platinum ECDIS to support officers in the familiarisation progress. It should be researched if this created manual has an impact on the performance of the officer. Leading to the question if the created manual operates effectively as a quick guide for officers to the NACOS Platinum ECDIS.

2 Creation of the Manual

The manual by itself was intended to be guide for the on signing officer. It can help the officer to, especially after a longer time of being away from the system, adapt and refresh as well as new users to adjust their knowledge about electronic chart displays

and information systems. The structure by itself was intended to cover the main points an average officer needs to cover during a watch. The structure is as follows:

- User Interface
- Basic Features
- Chart Work
- Monitoring a Route
- Backup and Synchronisation
- Alerts
- Sensors
- Planning a Route
- Chart maintenance

The aforementioned structure allows the reader to navigate through the main aspects of a watch. This created manual is not an in depth manual to the NACOS ECDIS Platinum but a quick guide, which intend is to help the reader during the watch. However, in the manual are references to in depth manuals provided by the manufacturer.

It needs to be kept in mind that the manual is specific for a vessel of a cruise company. Therefore, throughout the manual the officer will find references to the specific vessel.

The manual itself has been written in a step-by-step format which allows the reader to follow it easier. An easy manual will help better in the situation and offers faster solutions than an in depth manual. In this way the manual is working in a supportive role for the user.

In the following the structure headlines are briefly summarised.

The first chapter in the manual, the User Interface, the reader is introduced to the general layout of the system as well as to the help facilities within the system. This

chapter includes additionally the functionality of the mouse and its properties. The Basic Features chapter helps the reader to orientate on the chart as well as the customisation of the chart. Following in the Chart Work chapter the reader can find on how to navigate in the chart as well as tools on how to safely navigate with the help of the system.

In the Alert chapter the manual shows how to identify an alarm in the system and the alert management.

The sensors chapter shows how to change sensors and check the sensors integrity.

The Planning a Route chapter allows the reader to gain basic knowledge on how to create and adjust a route. In the following chapter, monitoring a Route, the reader is introduced on managing a system relevant route.

The chapter of Chart Maintenance helps the reader to update the charts and the chart permits.

In the last chapter the reader can find the systems information as well as see how to create and restore a backup.

3 Research Methodology

After the manual in the regard of my intentions for it was created, a way was needed to prove or disprove if this manual is working effectively as a quick guide for the officer to the ECDIS system. A way to prove this theory is by creating an experiment in which the knowledge of the reader is being tested.

The test itself needs to test the reader by asking straightforward questions, which test the general orientation of the reader within the system as well as questions which are specific to the NACOS Platinum ECDIS. Additionally, it needs to be possible to answer the questions without the manual and experience with the system. In this way it can also be observed if also new users to the system can prove or disprove the effectiveness of the manual.

In order to protect the integrity of the person being tested, there will be no right or wrong on how to perform a task. Several tasks will have multiple ways on showing

the persons knowledge. The question then arose on how to measure the performance of the person being tested.

Since the manual is intended to help the reader while being on the system itself, time would be the measurement to evaluate the performance. Logically, the faster the person can absolve the test the better the manual helped the person. But to accurately measure the performance a comparison is needed to show the contrast to officers who do not have the manual as support.

A comparison can be created by dividing the group, which is to be tested, into two. By dividing them the possibility is created to test one subject group with the manual as a quick guide in physical paper form and the other without the manual.

Since the test will ask knowledge in the ECDIS system the only requirement for the subject group is to be familiar with the maritime industry, particularly the nautical aspect of it. To ensure that the subjects are familiar with the aforementioned aspects they will be students of the bachelor maritime management degree at Novia Yrkeshögskolan.

Since the thesis if the manual is effective as a quick guide to the subject in the NACOS Platinum ECDIS is not proven it would require a way to see, on what the manual is lacking in order to do so. Hence, a questionnaire will be given to the subject after the completion of the test, in order to gather information provided by the subject to see the difficulties for the subjects in the given tasks.

The results by the concluded experiment will then show if the manual is effective as a quick guide for the reader in the ECDIS Platinum System.

4 The Tasks

Since the emphasize of this research is the testing the subjects' abilities with the NACOS Platinum ECDIS the tasks by themselves should not be too hard to achieve. The measurement of evaluating the abilities of the subjects is time. Henceforth, a task structure of multiple tasks needs to be in order of the main premises of the manual, which is to help the subject in fast-paced tasks.

The subjects are being asked 6 tasks in total to evaluate their abilities within the NACOS Platinum ECDIS.

In the following the task are written in addition with the solutions on how to complete them.

1. *Show the help facilities and open the manufacturers manual.*

This task can be solved by opening the super home and clicking on the read documentation link.

Here the manufacturer provides a digital manual to help the reader to find in depth information about the system. This task was created to show that the manual supports the reader also with in depth information required if the created manual does not cover the required information.

2. *Correctly identify the tools menu and create a VRM of 2nm.*

In this task the subject in the experiment shows an important aspect of the system, the tools menu. The tools menu enables the officer in various ways from identifying of targets to route creation or monitoring. This task can be achieved by either showing the tools menu and selecting a VRM of 2nm miles with the EBL&VRM menu or by showing the tools menu and creating a VRM of 2nm with the keyboard.

3. *Open the ECDIS Chart 1.*

Here the subject is required to open the ECDIS Chart 1 which is an asset to see the ECDIS symbology. This task can be completed by right clicking the chart in the application area to open the context menu. In the contexts menu the subject can then select the ECDIS Chart 1.

4. *Open the trial menu.*

The trial menu helps the subject to correctly identify hazardous targets while planning the next course. The trial menu can be opened in the permanent area in the side bar under the permanent area. Here the subject can find under targets the drop-down menu of the trial menu.

5. *Create a position fix.*

This task can be solved in two ways. The first way of solving it, is to open the EBL&VRM menu in the tool's menu. Additionally, the LOP menu must be opened in the tool's menu as well. Now the subjects create an EBL and VRM to the objects which is being monitored. The subject needs to make sure the EBL and VRM are intersecting at the monitored object. Following, the subjects right click the intersected point to open the contexts menu. The contexts menu will show now: Create LOP. The subjects create a LOP at the point of intersection. Now the subject adjusts the LOP in the LOP menu, which was opened earlier. Once the adjustment menu is opened the subjects clicks on TAKE EBL and TAKE VRM, press set to confirm. When the set button has been pressed the menu closes automatically and the option drop position fix can be selected at the bottom right corner of the LOP menu. The task has now been completed.

The second way on solving this task is to create at least two LOP. The two LOPs can be created at the desired object by right clicking the application area to open the context menu. Here a Lop can be created. The created LOPs bearing needs now to be dragged to the own ships position. Where both LOPs intersect the subject can drop a position fix.

This task was specifically chosen to be in the experiment because it requires the subject to interact across the application area as well as the tools menu. It shows the general knowledge with the system and its way of interacting.

6. *Open the system information.*

This task can be completed by pressing the in the menu bar the menu button and select about. Here the user can show the system relevant information.

5 The Questionnaire

To correctly understand the experience made by the subjects, a questionnaire after the experiment was needed to gain substantial information about the subject and about his/her/theirs experience regarding the tasks. Additionally, the questions here need to be in a consistent form to appear for both subject groups, with and without manual, plausible. The questionnaire consisted of 4 questions. In the following the questions in the questionnaire are described as well as their purpose.

1. *Have you had any experience with the NACOS Platinum ECDIS?*

This question was intended to see if the tested subject has made experience with the system beforehand. It could be answered by Yes or No. Whether through work or through the Universities simulators, experience with the system give meaning in regard of the manual to their purpose as assistance to officers who will resign on a vessel with said ECDIS system.

2. *The test in regard of your abilities was easy to complete.*

Here it was important to see how the tasks´ difficulty was experienced by the subjects. It could either confirm or contradict the idea of the tasks being too difficult for the subject. To remind the reader of this research, the task needed to be designed in a way that they are fast paced tasks to solve for the manual to have a maximum impact for the subject. Here the subject could answer with five different options; Strongly Agree, Agree, Neutral, Disagree and strongly Disagree.

3. *I found Task No. (XY) hardest to complete.*

On designing the tasks, it was of importance to see the subject's awareness on the difficulties in each task. Therefore, what task was for each subject the hardest to complete and if the answer to this question varies between the two subject groups.

4. The Manual/A manual has/would have helped me in solving task XY faster.

This question is strongly connected to the question 3 and is an addition. Henceforth, if the difficulty of the task is reduced by the manual and if so, which task profited the most from the presence of the manual. It is to be noted that this question varies between the two subject groups. Those who had the manual received the question: *The Manual has helped me in solving task XY faster*, while the group without the manual received the question: *A manual would have helped me in solving task XY faster*. In this way the subjects can underline the thesis of the manual being effective for solving the fast-paced tasks. Here the subject could answer with five different options; Strongly Agree, Agree, Neutral, Disagree and strongly Disagree.

The above listed questions are not in regards the main source of information in this research. They rather serve the premise of showing the experience for the subject in the test. The purpose of the manual is to support the reader in fast paced task with the NACOS Platinum ECDIS, therefore It was for importance to see if the manual

proves or disproves this purpose and by asking these questions the experience of the subjects can be included into the research.

6 The Results

Once the task and the questionnaire were finalised the experiment could be conducted. For the experiment 8 volunteers were found. From these volunteers all fulfil the requirement of being students of the bachelor maritime management program at Novia Yrkeshögskolan, some had made experience with the NACOS Platinum ECDIS whereas most of them had not.

In the following tabular the result can be viewed.

Subject	Manual	Time (min:sec)	Time (min)
1	YES	12:15	12.25
2	YES	6:29	6.48
3	YES	20:56	20.93
4	YES	18:39	18.65
5	NO	24:13	24.16
6	NO	28:43	28.72
7	NO	9:08	9.13
8	NO	23:05	23.08

Overall, it can be said that after the test was conducted, the subject group with the manual managed to finish the tasks given faster than the subject group without.

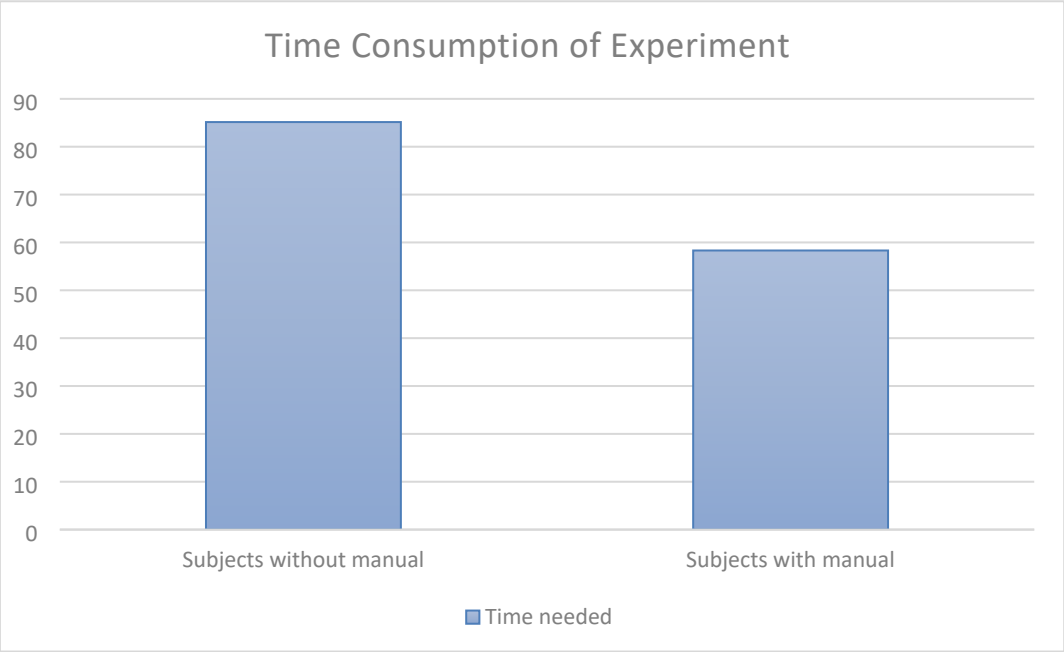

Figure 1

In these graphs it can be observed that the total time of the subject group who had the manual as support was reduced. Here the Y axis explains the total time needed in min.

Since the total time needed for the group with the manual was 58.316 min, the total time for the group without the manual was 85.15 min, it can be observed that the total time with the manual as support was reduced by 31.5%. Additionally, the average time per subject has also been reduced. The average time needed for the completion of the tasks has been lowered from 21.29 min to 14.58 min, dropping therefore as well by 31.5%

Since a questionnaire was implemented with the research the result of those will give a view of the experience with the tasks from the subjects.

Subject	Manual	Q.1	Q.2	Q.3	Q.4
1	YES	NO	D	5	A
2	YES	YES	SA	5	A
3	YES	NO	D	3	SA
4	YES	NO	N	5	A

5	NO	NO	D	5	A
6	NO	NO	SD	5	A
7	NO	YES	A	5	N
8	NO	NO	N	5	A

For space economical reasons the Questions were abbreviated (e.g., Question.1 = Q.1). Additionally, the answers to question 2 and question 4 were abbreviated as well (Strongly Agree = SA, Agree = A, Neutral = N, Disagree = D and strongly Disagree = SD).

In the questionnaire it can be observed that 75% of the subjects did not have any experiences with the NACOS Platinum ECDIS. Fortunately, the 25 % with experience in the system were put into the different group. This results that it shows that also subjects who have experience with the NACOS Platinum System can benefit from using the manual. In the statistics it is shown that from the two subjects who have experience with the system the time of completing the tasks has been reduced.

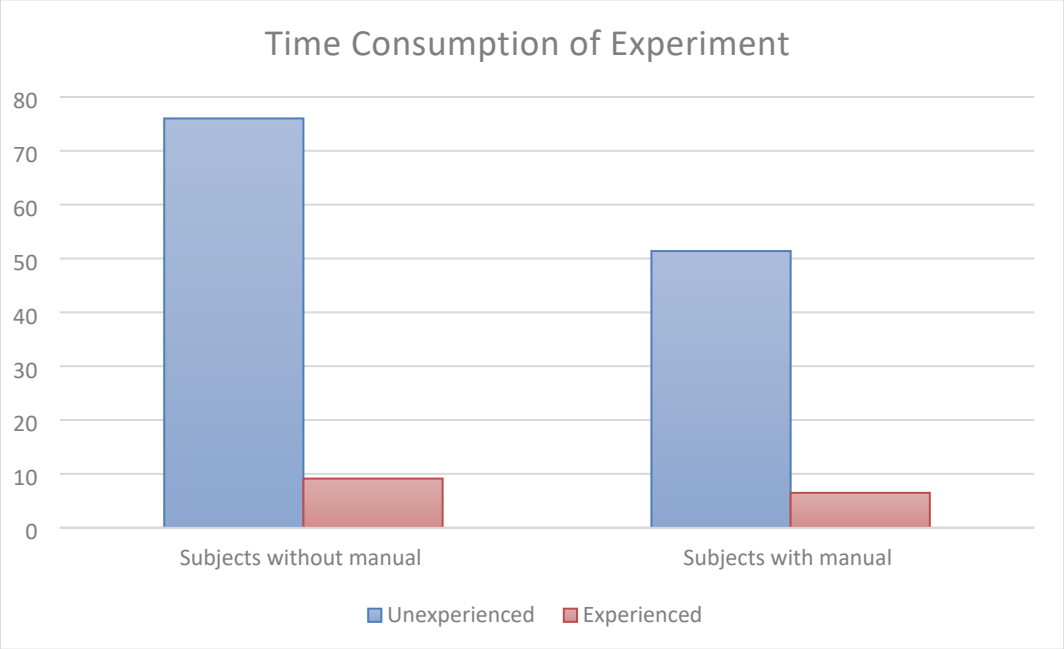

Figure 2

Figure 2 is a graphical representation of the statistics. The two subject groups are placed next to each other while the experienced subjects are separated from the unexperienced ones. The Y axis represents the time needed in minutes.

Here it can be observed that the total time needed for completing the task has been reduced in the subject group without the manual. To be precise the total time needed for the task has been reduced from 76.016 min to 51.83 min, showing that the time needed dropped by 31.8%.

In comparison to the two subjects who have experience, we have the subjects who do not have made experience with the system beforehand. The time between the two subjects with experience int the system has dropped from 9.13 min to 6.48 min, therefore reducing the time needed by 28.9%.

Overall, the experience for the tasks were for the subjects similar, the average opinion on the tasks is disagreement for the group without the manual whereas the group with the manual has a neutral opinion with the statement that the tasks were easy to complete. This would show that most subjects had not made experience with the system beforehand which was underlined by Q.1.

In the questionnaire it can also be observed that 87.5% of the tested subjects experienced task no. 5 to be the hardest. Whereas only 1 out of the 8 subjects found task no.3 is the hardest. This could be due to the fact that task no. 5 was a task created to challenge the subject on a variety of levels. As explained in task chapter this task requires the subject to interact across the application area as well as the tools menu. Therefore, challenging the subject across two levels. On the other hand, it is rather surprising that one subject chose task no. 3 to be the hardest. This could be due to the fact that the ECDIS Chart 1 is a tool used in multiple ECDIS systems and the subject did not make the experience in other ECDIS systems to find it or was generally unaware of this concept existing.

Lastly, the average of most subjects with the manual being tested to Q.4 was that they agree with the manual supporting them. In contrast the group without the manual would have wished a manual to support them while solving the tasks.

7 Conclusion

In order to either prove or disprove the effectiveness from the created manual as a quick guide in the NACOS Platinum ECDIS, an analysis of the main aspects of the research needs to be conducted.

In regards of the research method, a hybrid was used between an experiment and a questionnaire. Whereas the experiment was the main contributor to the research the questionnaire acted in a supporting role to the experiment in showing the difference in the experience of the subjects.

The experiment itself was conducted well. The tasks given in the experiment were working under the premises of showing if the manual is effective in regards of its intention. The results resulting from the experiment were supporting the hypothesis.

Additionally, with the questionnaire it could be observed if the perception of the task being given varied between the two subject groups. As stated in the chapter results the statement of the tasks being easy has seen rather disagreement from the group without the manual while the group with the manual had a rather neutral opinion on that statement. Therefore, the questionnaire also supports the role of the manual.

The results from the experiment and the questionnaire were in line with the expectation of this research. In order to receive more detailed results a wider group of subjects would be needed. Since humans vary, so does the performance of the subjects in the experiment. The experiment does not include the general knowledge of the subject with ECDIS systems in general. A parameter has been set, however the undetermined parameter of general knowledge of the subject remains. Therefore, to receive more detailed results in this research a wider subject group would be necessarily.

Non the less the number of subjects used for this research give an insight of the thesis being proven even though a wider subject group would optimise the result.

The author of this research believes that the research question has been answered. The result speaks for the effectiveness of the manual as a quick guide. The research

method with set parameters has been conducted in order to give scientific evidence for the thesis and the analysis from the research method proves the research.

7.1 Continuation of Research

For the continuation of this research, it would be interesting to see the digitalisation in this field. It has been observed during the conduction of the experiment that many subjects were struggling with the manual being present in paper form. By searching through the papers time was lost which was in this research regarded as a measurement of the effectiveness of the manual. A tablet computer with search function could massively reduce the time for the subjects to solve the task being given and therefore improve the effectiveness of the manual further. Additionally, a better structure of the manual could be achieved in order to reduce the time of the subject searching through the manual for the right chapter to find and solve the task.

In order to show more effective results a wider subject group can be acquired. With a wider subject group, the results from this thesis can be more detailed.

8 Appendices

In this chapter of the research is the manual included which was used for the experiment. The File is present in a word document.

Platinum ECDIS Manual.docx