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BENEFITS IN THE DECK CADET TRAINING EVALUATION BY RUBRICS

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Abstract. Recently, in our school we have changed the way of evaluating the deck cadet training we had used for years through a rubrics-based evaluation system. In this paper we explain and justify the changes we have incorporated, and also the benefits that we obtain and the contributions to the learning of the students that the new system of evaluation gives us.

1 INTRODUCTION

In the Degree in Nautical Studies and Maritime Transport that is taught at the School of Nautical Studies in Barcelona, the students, among other subjects, must complete a practical 4-month boarding period as bridge cadets. Once this period of practices is finished, students are evaluated through a written report and a public presentation of it. A unique feature of deck student practices is that with the exception of those students who are unable to accomplish the boarding days, do not present their work within the deadline established by the centre, or cannot obtain a positive report from the officers of the ship where they were on-board, they usually succeed with a percentage of 100%. However, with the evaluation system that we had, the students didn't know what their mistakes had been to correspond with the grade obtained, since they had done their work "blindly", That is, without knowing exactly which items would be evaluated and how.

The evaluation system of work and presentation was in the past structured in two parts, which were worth 50% of the qualification each. These were all the evaluation criteria that we had at the time of assessing the practices. It was insufficient, since it did not provide tools to the observer to evaluate correctly and it created incomprehension to the students, when they asked where they had been wrong or what they should improve. Faced with this situation, following the ideas of [1] about quality of the evaluations, we decided to modify the evaluation criteria and create an evaluation system, consisting of 5 items for each part, among which was, the time used, presentation, use of ICT, detail of the contents or communication capacity of the student.

Aware that the system had improved but still left unsolved aspects, such as, in the expository part, the gesticulation, the voice or the visual contact, it was decided to improve

the evaluation system by completely transforming the method, and implementing a system of independent rubrics for work and exposure, adopting as a model those created by [2], and modified partially to be adapted to the singularities of the evaluation of practices on board a ship, including criteria that were absent and that are considered important here.

In addition to the rubrics, we also opted to modify the index of the work (written memory) that contained the subject that, in our opinion, was totally descriptive and did not contribute anything to the student's day-to-day life on board and did not allow to present the own conclusions of the practices. Given this situation, we decided to modify the index to give it a more personal character. We added points that include the tasks that the students are doing day by day, during navigation, etc. On the other hand, it has been incorporated that the students would explain how to adjust specific controls of navigation systems, such as radar or autopilot. We also decided to include a personal assessment and a list of problems raised and their resolution. Finally, in the index of the written work, it was included a set of annexes in which the student must draw by hand different areas of interest of the ship, bridge, engine room etc., noting all the names of the elements found in that area in English and in Spanish. The fact of making these annexes by hand gives the student a better knowledge of the English language and a better internalization of the existing elements on the ship.

2 MODIFICATION OF THE EVALUATION OF PRACTICES

It was decided to keep the evaluation based on the written memory and the oral exhibition, with the same relative weights as previously (50% each). Each part was modified as will be described in the following, and it was decided to perform an evaluation through rubrics [3].

2.1 Initial written memory index

Concerning the written memory, we started from an index that in our opinion was too descriptive constituted by the following points:

a) Description and operation of communications, situation and navigation equipment
b) Description and operation of the security, fire and pollution control system.
c) Description and operation of the propulsion system.
d) Description of loading and unloading equipment. Stowage plans and stability calculations.
e) Description of the tracks and sailing directions.

As it can be seen the points are largely descriptive and do not reflect the working or the qualities of the student. Due to this assessment, we considered that it should be modified, without going too far from the initial text, to adapt it to a model in which the student should have a more prominent role.

If we look at the original index of the written memory, we can see that the items to be assessed were sometimes not present in the index of the work and this fact generated a difficulty for the evaluator. On the other hand, in some cases, since the student did not have information on the items to be evaluated, nothing was contributed by the student. Basically, it was produced in points c) and d), specifically the most important ones for having contributions and personal opinions from the student. The reader might think that the items were not adapted to the memory index, but the answer is because the regulations required a

minimum index for written memory and, as far as possible, an attempt was made to comply with the mentioned regulations and, where appropriate, what was to be modified was the index that was subsequently made. In any case, we think that the items of the evaluation could not be exactly the same as those of the memory index but should include general aspects that serve for any written work and this adaptation is a task that we must face in the short term.

2.2 Old evaluation criteria

The old evaluation criteria were initially detailed giving weights, as shown here, maintaining the 50% for the written report and 50% for oral report they were as indicated:

Written report:
a) Presentation (index, formatting, images ...) 10%
b) Detail in the content of the points. 30%
c) Description of the tasks on board. 30%
d) Personal contributions and improvements. 30%

Oral report:
a) Use of ICT. 10%
b) Student's communicative capacity. 30%
c) Ability to synthesize. 20%
d) Adjustment to the available time. 10%
e) Evaluation of the answers of questions from the evaluator. 30%

2.3 Current index of written memory

The index of the written memory was modified to include 7 points detailed below:

a) Main characteristics and description of the ship spaces and decks.

We introduced this point in the index because we believe it is important that the student gets an overview of the ship and the spaces that comprise it, both those dedicated to loading, rating, ballast, fuel, etc., as well as the general characteristics of the ship where the student practices: length, beam, power, year of build, IMO number…

b) Organization chart on-board and functions of the crew.

In the previous point, we tried that the students took a general view of the ship and its spaces. Here, we intend that the students know the command structure of the ship, identify each position and relate the functions of each crew member according to their position inside the vessel's chart. We think that the best way for students to find their "position" on board is to know the context in which they are located.

c) Explanation of the daily tasks performed by the student in the manoeuvres of docking and departure, during navigation, in periodic exercises and loading/unloading.

This point is very important since the student must be able to explain his/her daily tasks in the requested situations. These were chosen thinking that they were the most relevant in the students' performance, although we understand that it could be expanded based on the criteria that one takes from the term "relevant". For the choice of situations, the chosen ones are those in which the student will spend most of his time on board. Due to the fact that the student can perform the practices in ships other than cargo ships, we established that this point could be

partially replaced if it was the case that, due to the particulars of the vessel, some situation could not be met, such as cargo operations in a passenger ship. This can be modified by other tasks related to the type of ship, such as control passengers on a passenger ship.

d) Equipment operation.

At this point, instead of describing the equipment and explaining its generic operation, we decided that it would be much better if the student explained some specific adjustment process in the equipment and selected, without the intention of collecting all of them, the following points, which are considered important, although it is understood that many more could be added:

- Adjustment of clutter control and rain on the radar.
- Creation of a travel and route plan in the ECDIS.
- Adjustment and transfer of the route to the autopilot.

This point is inspired by the student's notebook that is used in Germany, which is considered useful.

e) List of problems raised and the procedure for their resolution.

This point, together with the following, is obtained from the index that appears in the regulations of external practices of the Barcelona School Nautical Studies (FNB) concerning practices in land companies, derived from the rules that regulate the practices at our University, approved by the Governing Council Agreement No. 233/2014 of 12/18/2014 and amended by the Governing Council Agreement No. 30/2015 of 02/10/2015. Annex III specifies the aforementioned index, which includes different points that are considered of interest, to give the students a greater participation and opinion in benefit of their training. One of them is this section where the student must present the problems appeared during their practices and the process used for their resolution.

f) Evaluation of the practices and suggestions for improvement.

At this point, the students must make an assessment of their practices, contributing the positive points, the negative ones and the things that were detected and should be changed for a better performance of the ship or the management practices. The students are given the possibility to express their feelings obtained in the boarding and also those received in the management from the centre, giving to the lecturers, after the analysis, the possible measures of improvement in the management and operation of the practices.

g) Preparation of plans (Annexes).

This point, like point d) of the index, is inspired by the deck student's practice notebook used in Germany and consists on the student making free-hand drawings of spaces on the ship considered important for the student's training. In them, the student must specify all those elements located in the specific area. In addition, we ask the student that he/she must name these elements in Spanish and English, thus achieving, in addition to knowledge of the elements and their names, the use of the English language. The points to be drawn by the students are:

- Bow manoeuvring area.
- Manoeuvring area aft.
- Engine room.

It is believed that drawing freehand a specific area and writing the names of the elements, increases the retention of information, with respect to doing it through a computer and therefore helping the student's learning.

3 EVALUATION THROUGH RUBRICS

The evaluation is an essential part of the learning process, it is a basic part of any curricular design. The refs. [4-8] mention that the most important goals of educational evaluation are:
- The evaluation should be an educational process.
- The evaluation should be a means to help students to learn better.
- The evaluation should be a continuous process.
- The evaluation supposes a valued and systematic reflection.
- The evaluation understands and interprets the teaching-learning process, in order to achieve the formulation of value judgments.

The different types of evaluations are the initial evaluation, which is done at the beginning of the educational process and aims to the planning of it [9], and the final evaluation, which is done at the end of a learning period and its main aim is the verification of the learning process developed during it [9].

The evaluations that are considered relevant are clearly identified with final evaluations. Given this fact, we would like the student's learning to be more involved in the evaluations and vice-versa. Therefore, we accept that the students suggest the inclusion of some criteria in the rubrics, allowing the students to shape their criteria. It has been shown that this is benefitial for learning [10-11]. Knowing the location of our evaluation and also the particular characteristics of the exercises to evaluate, the evaluation system by rubrics was the chosen option. Two rubrics have been adapted, one for each exercise, on the basis of other authors [2]. Also, in part the students will be given the opportunity to suggest further points to include.

As explained in the introduction, the evaluation of the deck cadet training consists of two exercises, on the one hand the preparation of a memory or written work with a specific index and, on the other hand, an oral presentation, where the student explains in public his/her training on board. It was also decided to change the way of evaluating: going from the old system to a rubrics based system. The points chosen for both the written part and the oral part are detailed below:

3.1. Items to be evaluated in the written report

The rubric for the written report is as indicated in Table 1, each item has the same value, with a simple rating to facilitate its application. The rating scale is as follows:
Excellent: the criteria for each element are developed throughout the entire memory or work. Master the different elements and show security and interest at the time of writing. (1 point).
Acceptable: some of the criteria are not present or do not appear with enough clarity. It denotes a certain lack of dedication in the preparation of work. (0,5 points)
Insufficient: most of the criteria do not appear throughout the written memory. The few that appear are poor. Show little or no dedication to the writing of the memory. (0 points)

Table 1: Rubric for the written report

Scale of punctuation	Excelent (1 points)	Acceptable (0,5 points)	Insufficient (0 points)

Main characteristics and description of the spaces of the ship and decks			
Board chart and crew functions			
Explanation of daily tasks performed by the student in the manoeuvres, docking, leaving, during navigation, in periodic exercises and loading.			
Operation of equipment.			
List of problems raised and the procedure for their resolution.			
Evaluation of the practices and suggestions for improvement.			
Preparation of plans (Annexes).			
Format			
Vocabulary			
Grammar			

3.2. Items to be evaluated in the oral report

In the oral presentation, the items were more suitable for the evaluation. Nevertheless, the same inconveniences that were present in the evaluation of the written memory were also present in this part. In the previous method of evaluation there was not a list of the items to evaluate, or the evaluation criteria of each of the items. As for the percentages, they were set according to the importance of each point determined by the evaluator. Then, the evaluation system of the bridge students' practices oral part was replaced by a new system based on rubrics. The oral presentation consists on an explanation of the written memory and the answering of questions raised by the professors. The items chosen for the evaluation are the ones indicated in Table 2. The rating scale is the same as in the written report.

Table 2: Rubric for the oral report

Scale of punctuation	Excelent (1 points)	Acceptable (0,5 points)	Insufficient (0 points)
Introduction			
Speaking			
Anecdotes and analogies. Humour			
Operation of equipment.			
Domain of the subject			
Visual contact			
Voice			
Enthusiasm and interest in communicating with the public.			
Conclusion			

Time used			

4 CONCLUSIONS: BENEFITS IN THE EVALUATION

Through this system, some benefits are obtained [3, 6, 12-13]. With the use of rubrics, the work of evaluators is eased and confidence is given to them, they manage to guide the students, create a feedback between evaluator-student and correct the errors so that they can improve in the future. There are also benefits in the performance of the students since they make the previously known evaluation criteria on their own [10-11]. Several authors show that greater understanding of the evaluation criteria generates a higher academic performance [14-15]. The doubts that the students had when they are given the final grade are, therefore, eliminated. The students know in advance how they will be evaluated, then they have the possibility to improve the exercises and this is what is helpful for learning. The evaluators also benefit since they have tools as worksheets that allow immediate evaluation. By means of them, the evaluator may be evaluating in real time, and can even provide the qualification of the presentation once finished or at the end of the session, informing the student about his/her strengths and about the items he/she should improve for future public presentations.

REFERENCES

[1] CADENATO, Ana, MARTÍNEZ, Miguel, AMANATE, Beatriz, JORDANA, José, SÁNCHEZ, Robert, FARRERONS VIDAL, Oscar, ISALGUÉ, Antoni y FABREGA, Joan, 2012. Criterios para actividades de evaluación de calidad. *CIDUI Congrés Internacional de Docència Universitària i Innovació*: *The University, an institution of society.* http://www.cidui.org/revistacidui/index.php/cidui/index [Accessed May 2018]

[2] RUBIO, Joana, 2018. Rubric for the evaluation of an oral exhibition: GRAPA, UPC. https://www.upc.edu/rima/ca/grups/grapa/recursos/aportaciones-del-grupo/joana-rubio [Accessed March 2018]

[3] MERTLER, Craig A, 2001. "Designing scoring rubrics for your classroom". *Practical Assessment, Research & Evaluation*, Vol. 7, No. 25, 1-8

[4] SAŃCHEZ VERA y María del Mar, PRENDEZ ESPINOSA, Mari Paz. 2011, (C-193) Rubricas de evaluación en la enseñanza universitaria. *Congreso Internacional de Innovación docente. Universidad de Cartagena*.

[5] CANO, Elena, 2015. The rubrics as an assessment tool of competency in higher education: use or abuse?. *Revista Profesorado*, Vol.19, 2. http://www.redalyc.org/pdf/567/56741181017.pdf [Accessed March 2018]

[6] GARCÍA GARCÍA, María Jesús, TERRÓN LÓPEZ, María José y BLANCO ARCHILLA, Yolanda, 2010. Desarrollo de recursos docentes para la evaluación de competencias genéricas. *Revisión,* Vol 3, Nº 2. Universidad Europea de Madrid. http://www.aenui.net/ojs/index.php?journal=revision&page=article&op=view&path %5B5D=70 &path%5B%5D=113 [Accessed March 2018]

[7] ESCUDERO, Juan Manuel. 2009. Las competencias profesionales y la formación universitaria: posibilidades, riesgos. *Revista de docencia universitaria, 2, 7-26*. http://revistas.um.es/redu/article/view/35231/33751 [Accessed March 2018]

[8] GARCÍA, María Jesús y TERRÓN, María José. 2010. Desarrollo de Recursos Docentes para la Evaluación de Competencias Genéricas. *Revisión, Vol3 ,No 2*. http://www.aenui.net/ojs/index.php?journal=revision&page=article&op=view&path%5B%5D=70&path%5B%5D=113 [Accessed March 2018]

[9] ARRIEN, Elisabet, UBIETA MUÑUZURI, Eduardo y UGARRIZA OCERIN, José Ramón. 2012. La evaluación inicial en las aulas de aprendizaje de tareas. *Gobierno Vasco*. http://www.euskadi.eus/contenidos/informacion/dig_publicaciones_innovacion/es_neespeci/adjuntos/18_nee_110/110016c_Doc_IDC_aat_eval_ini_c.pdf [Accessed March 2018]

[10] PUIGDELLÍVOL, Ignasi y CANO, Elena. 2011. La rúbrica en los estudios de educación. En: K. Buján, I. Rekalde y P. Armendi (Coord.). La evaluación de competencias en la educación superior: Las rúbricas como instrumento de evaluación. *Madrid. EDUFORMA, pp. 131-156.* http://www.redalyc.org/pdf/567/56741181017.pdf [Accessed April 2018]

[11] PUIGDELLÍVOL, Ignasi, GARCÍA Nieto y BENEDITO, Vicente. 2012. Rúbricas, más que un instrumento de evaluación. En: *E. Cano (Coord), Aprobar o aprender. Estrategias de evaluación en la sociedad red. Barcelona: TRASMEDIA XXI. pp. 67-94*. http://www.lmi.ub.es/transmedia21/pdf/4_AprobaroAprender.pdf [Accessed March 2018]

[12] ALSINA, Angel. 2010. The 'pyramid of education math', A tool to help to develop mathematical competence". *Aula de Innovación educativa. 189, pp 12-16.* http://dx.doi.org/10.3991/ijep.v3iS2.2394 [Accessed April 2018]

[13] DEL POZO, José Antonio. 2012. Competencias profesionales: herramientas de evaluación: el portafolios, la rúbrica y las pruebas situacionales. Madrid: Narcea. https://www.agapea.com/Jose-Angel-del-Pozo-Florez/COMPETENCIAS-PROFESIONALES-Herramientas-de-evaluacion-el-portafolios-la-rubrica-y-las-pruebas-situacionales-9788427718920-i.htm [Accessed April 2018]

[14] O'DONOVAN, Berry, PRICE, Margaret and RUST, Chris. 2010. The student experience of criterion-referenced assessment (through the introduction of a common criteria assessment grid). *Innovations in education and Teaching international*, 38 (1), 74-85. https://www.tandfonline.com/action/showCitFormats?doi=10.1080%2F1470329013000028 73 [Accessed March 2018]

[15] O'DONOVAN Berry, PRICE, Margaret and RUST, Chris. Know what I mean? Enhancing student understanding of assessment standards and criteria. *Journal of Teaching in Higher Education, Vol. 9, 3.* https://www.tandfonline.com/doi/abs/10.1080/1356251042000216642 [Accessed March 2018]