

An investigation into Use of Multiple Choice Questions in Maritime English Tests – RZ Confidence Validation

Dr Martin Ziarati
Centre for Factories of the Future
Martin.ziarati@c4ff.co.uk

Abstract

This paper provides a validation method for the use of ‘multiple Choice questions’ in Maritime English competence. The described methodology can in fact apply in validation of multiple Choice questions in any other tests developed for subjects other than Maritime English. Furthermore, the methodology can be used in ‘true or false’ type or similar type of testing. It was developed by Ziarati in 1981 for testing of the knowledge of ship officer cadets at Highbury when he noticed that some students often guessed the answers in some cases. The method he developed not only deterred guessing but also offered an opportunity for students taking these type of tests to inform the test developer/setter as to whether the test was easy, average or hard and identify which question posed the greatest challenge. This approach then enabled the test developer/setter to learn from the feedback received and make sure the future tests are developed to make the test more balanced and fair.

The context

The current context of teaching and assessing Maritime English has been determined by the latest amendments (Manila, 2010) to the original IMO¹ International Convention on Training, Certification and Watchkeeping for Seafarers, known within the Maritime community as the STCW-78 Convention [1]. These amendments were made in response for the need of international standards in training seafarers towards acquiring practical skills and competences in addition to professional knowledge.

The shift to the competence-based approach to teaching and learning Maritime English implies that the goal of assessment should be communicative competence. The International Maritime Organization (IMO) recommends in the newly revised (2015) IMO Model Course 3.17 Maritime English that “Tests of English language competence should aim to assess the trainee’s communicative competence. This will involve assessing the ability to combine knowledge areas of English language with the various language communication skills involved in order to carry out a range of specific tasks. Assessment should not test the trainee’s knowledge of separate language areas alone.” [2]

Assessing linguistic competence in Maritime English adequately and reliably at internationally recognized levels has been brought to the attention of the IMLA-IMEC audience in the recent years. Research work in Maritime English Training (MET) studies

¹The questions are taken from EU funded MariEMS project – see www.maraifuture.org/projects for details. Questions are based on a series of development papers published in www.marifuture.org/publications

suggests that numerous attempts and efforts to address the complexity of the issue and explore the process of developing assessment instruments have been made throughout the years. Research into existing tests of Maritime English (both teacher-made and commercial) suggests that each training institution or company uses its own resources, experience and understanding of how and when Maritime English competence should be measured and how results should be interpreted and used. This, in turn, shows that despite the major breakthrough of the Maritime English competence Yardstick [3] as a standard it hasn't been applied properly and consistently yet.

Furthermore, little is known about the extent to which assessment literacy of Maritime English teachers and providers has been the focus of any specific training and monitoring. The main focus of teacher training seems to be the methodology of teaching English for Specific Purposes (ESP) and acquiring the specific subject matter knowledge from the maritime professional working environment. An ESP teacher is often a course and task designer, a teacher, a researcher and evaluator and his/her role "... becomes more pronounced as the teaching becomes more specific" [4]. It is generally assumed that as teaching and testing go together and are inherent parts of the educational process in any content area, ESP teachers have the necessary knowledge and skills to produce valid and reliable tests.

Most online maritime English tests extensively use multiple Choice or true or false questions; this is because in online testing systems the use of multiple Choice and true or false questions are common place and often inevitable. However, considering the IMO requirement that these tests should assess the competence of the test taker over a wide range of knowledge and skill areas these types of tests have not and will not satisfy the stated competence assessment validation of the IMO without a safeguard to ensure test takers are deterred from guessing.

Methodology

As safety at sea is of crucial importance [5], it should not be put at risk by the random production and use of unreliable and invalid tests of Maritime English proficiency. All decisions made in the process of test development and implementation should be based on solid testing principles.

If the knowledge of cadets and seafarers in Maritime English is to be competence based then there are primarily two choices. One to take the arduous path of the efforts such as those made by a collaborative project involving partners from six countries and is a core outcome of the EU-funded Erasmus+ MariLANG Project; producing an assessment methodology as a result of extensive research work in the field of language testing and experience in teaching and assessing Maritime English; or developing a validation for multiple Choice and true or false questions. The former approach is described in details in the project reports and in their website www.marilang.eu. This paper primarily describes a methodology based on MarTEL [6,7,8] Phase Tests incorporating also the MariLANG findings

¹The questions are taken from EU funded MariEMS project – see www.marafuture.org/projects for details. Questions are based on a series of development papers published in www.marifuture.org/publications

as well as allowing use of multiple Choice and true or false questions validated by the RZ Confidence Validation methodology.

The following are two general questions about related environmental issues, one using a multiple Choice question and the second using a true or false question. Guessing an answer on average could lead to a 25% overall mark.

- The main source of human-related CO₂ emissions is due to:

Burning fossil fuels

Deforestation

Transportation

Industrial and household uses

How confident are you that your answer is correct? 100%? 75%?, 50%? Or 25%?

Was this question easy, average or hard? Please comment.

- Climate change is a common concern of human kind requiring a global response.

TRUE

FALSE

How confident are you that your answer is correct? 100%? 75%?, 50%? Or 25%?

Was this question easy, average or hard? Please comment.

The RZ Confidence Validation statement viz., How confident are you that your answer is correct? 100%? 75%?, 50%? Or 25%? And fairness question namely, 'How confident are you that your answer is correct?' did not deter some test takers in a pilot study guessing but when the students realised that this a competence based test and that if they are not 100%, sure even if they answer the question correctly, they will not get a mark and in fact if they are only 75% sure they get -0.25 and, for 50% and 25% they get a -0.5 and -0.75 mark respectively; this did deter them from guessing the answers. If they answered incorrectly and that they were 100% sure or 75% sure these also applied as penalties. The penalty system for an incorrect answer or reward for a correct answer can be adapted by the test developer, and they can decide the scheme that they consider reasonable, that is to say that they can be assured that competence is tested fully and the RZ Confidence Validation is primary there to identify specific learning issues and above all make sure students do not try to guess the answer to a 'multiple choice' or 'true or false' question.

¹The questions are taken from EU funded MariEMS project – see www.marafuture.org/projects for details. Questions are based on a series of development papers published in www.marifuture.org/publications

The provision of asking 'Was this question easy, average or hard? Please comment' ensures that feedback is obtained on the degree of difficulty or ease the test taker has found a particular question.

With regard to the question to a particular type of ship cadet/officer, in the following case the Engineer Cadet/Officer multiple choice questions can be devised, as demonstrated below, in the same manner as above.

- The chief Engineer is responsible for matters concerning:

Maintenance of all engineering equipment

Maintenance of all cargo loading equipment

Maintenance of the ship's hull

Maintenance of lifesaving and fire-fighting appliances

How confident are you that your answer is correct? 100%? 75%?, 50%? Or 25%?

Was this question easy, average or hard? Please comment.

An example is given below.

- The ship's operation including planning, execution, controls and evaluations depends on the:

Master of the ship

Chief engineer of the ship

Chief Officer of the ship

Ship owner

How confident are you that your answer is correct? 100%? 75%?, 50%? Or 25%?

Was this question easy, average or hard? Please comment.

A further examples are as follows:

- The most important person in terms of energy efficiency implementation and execution on-board the ship is the:

Master

Chief Engineer

Chief Officer

¹The questions are taken from EU funded MariEMS project – see www.marafuture.org/projects for details. Questions are based on a series of development papers published in www.marifuture.org/publications

Second Engineer

How confident are you that your answer is correct? 100%? 75%?, 50%? Or 25%?

Was this question easy, average or hard? Please comment.

- The purpose of a sustainable management of a fleet depends on:

Ignoring the environmental credentials of the ship

Reducing overall fleet costs including fuel costs

Ignoring energy efficient technologies and low carbon fuels

Ignoring voyage planning techniques on increased distance

How confident are you that your answer is correct? 100%? 75%?, 50%? Or 25%?

Was this question easy, average or hard? Please comment.

The idea of this article is not to embarrass the ship cadets or officers but to ensure they are deterred from guessing. In a pilot study, the score was an average of 75% for experienced seafarers and 50% for cadets; surely they would have failed the test if competence testing was the main requirement of the test.

Conclusion

Developing a valid and reliable multiple-choice or true or false test is a challenge faced by many instructors, teachers and test developers. While we are not discouraging test developers or instructors/teachers to develop or use proven methodologies such as those developed by MarTEL and more recently by MariLANG partners, the application the RZ Confidence Validation makes guessing almost impossible hence enables the use of multiple choice and true or false questions in a competence based test. It also provides a means of identifying learning issues both in terms of the test takers knowledge or skill in a particular area of a given subject or more identifying a specific learning difficulty in a particular question. Decisions related to one aspect may have serious consequences for others [9].

Being fair to all test-takers demands that all steps in test preparation is carried out professionally, this is because decisions made is about real people and fairness has to be the issue if a test is to be fit for its purpose.

¹The questions are taken from EU funded MariEMS project – see www.marafuture.org/projects for details. Questions are based on a series of development papers published in www.marifuture.org/publications

References

- Standards of Training, Certification and Watchkeeping for Seafarers (STCW'78 as amended).
IMO Model Course 3.17 Maritime English, London, p.208, 2015.
- Cole, C. and Trenkner P., Yardstick, GAME Newsletter 29, Warnemunde, p. 11, 1994.
- Dudley-Evans and St. John, Developments in ESP. A Multi-disciplinary Approach, Cambridge University Press, Cambridge, p.13, 1998.
- Ziarati, R.; Ziarati, M., Review of Accidents with and on Board of Vessels with Automated Systems – A Way Forward, AES07, Sponsored by Engineering and Physical Science Research Council in the UK (EPSRC), Institute of Engineering and Technology (IET, Previously IEE), Institute of Mechanical Engineers (IMechE), IMarEST, 2007.
- R. Ziarati, E. Demirel. Establishment of a Common Platform for the Maritime Education and Training. IMLA21 Conference, St. John's, Newfoundland and Labrador, Canada October 9th - 12th 2013.
- M. Ziarati, R. Ziarati, A. Şihmantepe, S. Sernikli, U. Acar. DEVELOPING A MARITIME ENGLISH PROGRAMMES FOR MarTEL AND MarTEL PLUS – PROJECT SeaTALK. IMEC25 Conference, Istanbul, Turkey, 23 - 26 September 2013.
- A. Şihmantepe, S. Sernikli, S. Toncheva, D. Zlateva. Validating Maritime English Learning Outcomes And Competences. IMEC25 Conference, Istanbul, Turkey, 23 - 26 September 2013
- Bachman L.F. and Palmer A.S. Language Testing in Practice. Oxford University Press (1996).

¹The questions are taken from EU funded MariEMS project – see www.marifuture.org/projects for details. Questions are based on a series of development papers published in www.marifuture.org/publications