Does eLearning Work in the Maritime Industry?

By Murray Goldberg

Introduction

I am often asked by maritime training administrators and practitioners whether eLearning works. That is, "is eLearning or blended learning proven to be effective"? This is a natural question because despite being almost ubiquitous in higher education and other industries, eLearning is a relative newcomer to the maritime world. When I was (frequently) asked this same question by other university faculty members back in the late 1990's, all I could point to at the time was my own research and experimentation. Now, however, we are able to answer this question based on approximately 15 years of experimentation, research and implementation done in other industries.

In this article we provide an answer to the question "does eLearning work" for the maritime industry. It may be useful to tuck it into your back pocket for when you get asked the same question; a question I guarantee you will be asked sooner or later, if you are involved in maritime training.

To Be Clear

Before covering the evidence about eLearning, we should be clear that eLearning can never be a complete replacement for all maritime training. When we talk about training and competencies in the maritime world, we are talking about two major components: Knowledge and Skills. We may also be talking about other components such as attitude, experience, etc. But I suspect we can all agree that knowledge and skill are the two primary components required for maritime competency.

Aside from the notable example of simulation training, eLearning is primarily focused on knowledge acquisition. Knowledge forms the basis for all skills and competencies. There is very little question about this, but just in case there is any at all, note the following from the STCW Manila Amendments, Chapter II, Section B-II/1, Paragraph 14:

"Scope of knowledge is implicit in the concept of competence. ... This includes relevant knowledge, theory, principles and cognitive skills which, to varying degrees, underpin all levels of competence. It also encompasses proficiency in what to do, how and when to do it, and why it should be done. Properly applied, this will help to ensure that a candidate can:

- work competently in different ships and across a range of circumstances;
- anticipate, prepare for and deal with contingencies; and
- adapt to new and changing requirements."

So knowledge is critical and therefore worthy of our focus. Yet it is not the full story. Although knowledge is a requirement for competency, it is not sufficient. Hands-on training, experience, attitude, time, etc are all required to complete the picture. So while eLearning (as we will see) can improve knowledge acquisition in many ways, it cannot ever remove the need for hands-on training and experience.

Strength of The Evidence

Before I became involved as an eLearning developer, I was a faculty member of Computer Science at UBC studying eLearning effectiveness. Because of my early research, I became certain early on of the strengths (and limitations) of eLearning. However, since that time, a tremendous amount of research and implementation has been performed, and fortunately we now have a lot of evidence as to eLearning's effectiveness.

The best evidence I am aware of is a report published in 2010 by the U.S. Department of Education (US DOE). The report (the full text of which can be found here) is entitled "Evaluation of Evidence-Based Practices in Online Learning, A Meta-Analysis and Review of Online Learning Studies". The strength of this report comes from the fact that it is a meta-analysis. This means that it is not, in itself, one study or one opinion of the effectiveness of eLearning. Instead, a meta-analysis looks at a large number of independent studies and research projects which all try to answer the same question - does eLearning work? It then draws a conclusion based on the strength of the widest possible breadth of investigations. This is very powerful because any biases or study flaws are quickly filtered out of the collective response.

In the case of the US DOE study, the meta-analysis was formed after looking at roughly 1,000 studies, and then filtering them down to 45 studies which were sufficiently rigorous and covered the desired questions directly. These 45 studies were then carefully reviewed to distill the information for this one report. As far as I am aware, there is no better answer anywhere to the question "does eLearning work".

The Answer

The US DOE meta-analysis came to several conclusions. I encourage you to read the full report yourself, since there are many useful nuances to the conclusions below - all of which will provide a greater understanding of eLearning effectiveness. Let's look at some of the most notable conclusions:

Conclusion number 1: Online learning outperforms face-to-face learning:

> *"Students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction. Learning outcomes for students who engaged in online learning exceeded those of students receiving face-to-face instruction."*

The effect size here (the size of the difference in effectiveness) between on-line and face-to-face instruction was quite small, but it does exist with the "win" going to on-line learning. However, with the effect being so small, I have always considered the learning effectiveness between on-line and face-to-face to be roughly equivalent. We can say unequivocally that on-line learning most certainly does not produce inferior outcomes when compared to face-to-face instruction, as many incorrectly believe. I should note, however, that until I performed my own studies in the 1990s, I also assumed that eLearning would be inferior. I was wrong.

Conclusion number 2: Blended learning is best:

> *"Instruction combining online and face-to-face elements had a larger advantage relative*
> *to purely face-to-face instruction than did purely online instruction."*

Blended learning is the technique of combining learning modes - in this case on-line learning and face-to-face learning. The conclusion above indicates that when you use a combination of on-line and face-to-face training, the learning outcomes are better than for either face-to-face or eLearning alone. This makes intuitive sense because each mode of learning has strengths the other one cannot offer. Therefore combining them yields results that either alone cannot offer.

The conclusion here is clear, if your goal is to provide the very best training possible, you should use a combined approach involving both face-to-face training and on-line learning.

Conclusion number 3: Interaction with peers and/or instructors improves learning outcomes:

> *"Effect sizes [i.e. the improvement in learning outcomes] were larger for studies in which the online instruction was collaborative or instructor-directed than in those studies where online learners worked independently."*

This is a very important conclusion which cannot be stressed enough. One of the major advantages to on-line learning is its ability to connect people to one another. It facilitates informal learning by connecting trainees - allowing them to learn from one another in a way that face-to-face training can't. In addition, despite perceptions to the contrary, on-line learning can be facilitated by an instructor and, as the conclusion above shows, learning outcomes are improved when this is the case. Therefore, while it is indeed possible and effective for trainees to learn on-line independently, the best outcomes are achieved when we use technology to connect people to further facilitate the learning process.

Conclusion number 4: Blending and connecting are the most important considerations:

> *"Most of the variations in the way in which different studies implemented online learning*
> *did not affect student learning outcomes significantly … Of those variables, the two mentioned above (i.e., the use of a blended rather than a purely online approach and instructor-directed or collaborative rather than independent, self-directed instruction) were the only statistically significant influences on effectiveness."*

There are many different ways in which we can facilitate on-line learning. One of the variables we hear about the most is the media type - the choice between text, images, videos, audio, etc. The US DOE study looked at how delivery and media affected the learning outcomes. What they found was that aside from the decision to employ eLearning, the only two variables which created a significant improvement in learning outcomes were blending (combining face-to-face with eLearning) and connecting trainees to an instructor and other trainees - both of which were mentioned above.

Interestingly, however, it was found that substituting one media type for another (for example, video for text) made no significant difference in outcomes. So while there are clearly situations where one media type is preferable over another, this conclusion tells us that aside from these special situations, it is safe to choose media based on what is economical to create and maintain.

Conclusion number 5: eLearning works, regardless of the subject matter:

> *"The effectiveness of online learning approaches appears quite broad across different content and learner types."*

eLearning has been around long enough and studied long enough that we can safely conclude that it is effective for all kinds of knowledge acquisition. There is nothing special about maritime knowledge or maritime learners that make the field immune to the benefits of eLearning. That is not to say that there are no hurdles to overcome in maritime eLearning - there are. For example, the availability of internet on-board, and the sophistication of vessel based training both have slowed the adoption of eLearning in the industry. However, those obstacles are being (and have been) largely overcome by maritime-specific learning management systems (LMSs) and the industry is following suit by adopting eLearning methods. This study makes it clear that the benefits of eLearning are not domain-specific.

Conclusion

In the late 1990s, when eLearning was new to the world, there was a tremendous amount of activity around the question of whether eLearning produced good learning outcomes. The maritime industry has been slow to the "eLearning party" and there are some advantages to being the last one in. One of those advantages is the fact that the question of effectiveness has been answered. It works. Although it has taken roughly 15 years to come to that conclusion, the evidence is now overwhelming.

For more information, please refer to www.maritimeprofessional.com

About The Author:

Murray Goldberg is the founder and President of Marine Learning Systems (www.marinels.com), the creator of MarineLMS - the learning management system designed specifically for maritime industry training. Murray began research in eLearning in 1995 as a faculty member of Computer Science at the University of British Columbia. He went on to create WebCT, the world's first commercially successful LMS for higher education; serving 14 million students in 80 countries. Murray has won over a dozen University, National and International awards for teaching excellence and his pioneering contributions to the field of educational technology. Now, in Marine Learning Systems, Murray is hoping to play a part in advancing the art and science of learning in the maritime industry.