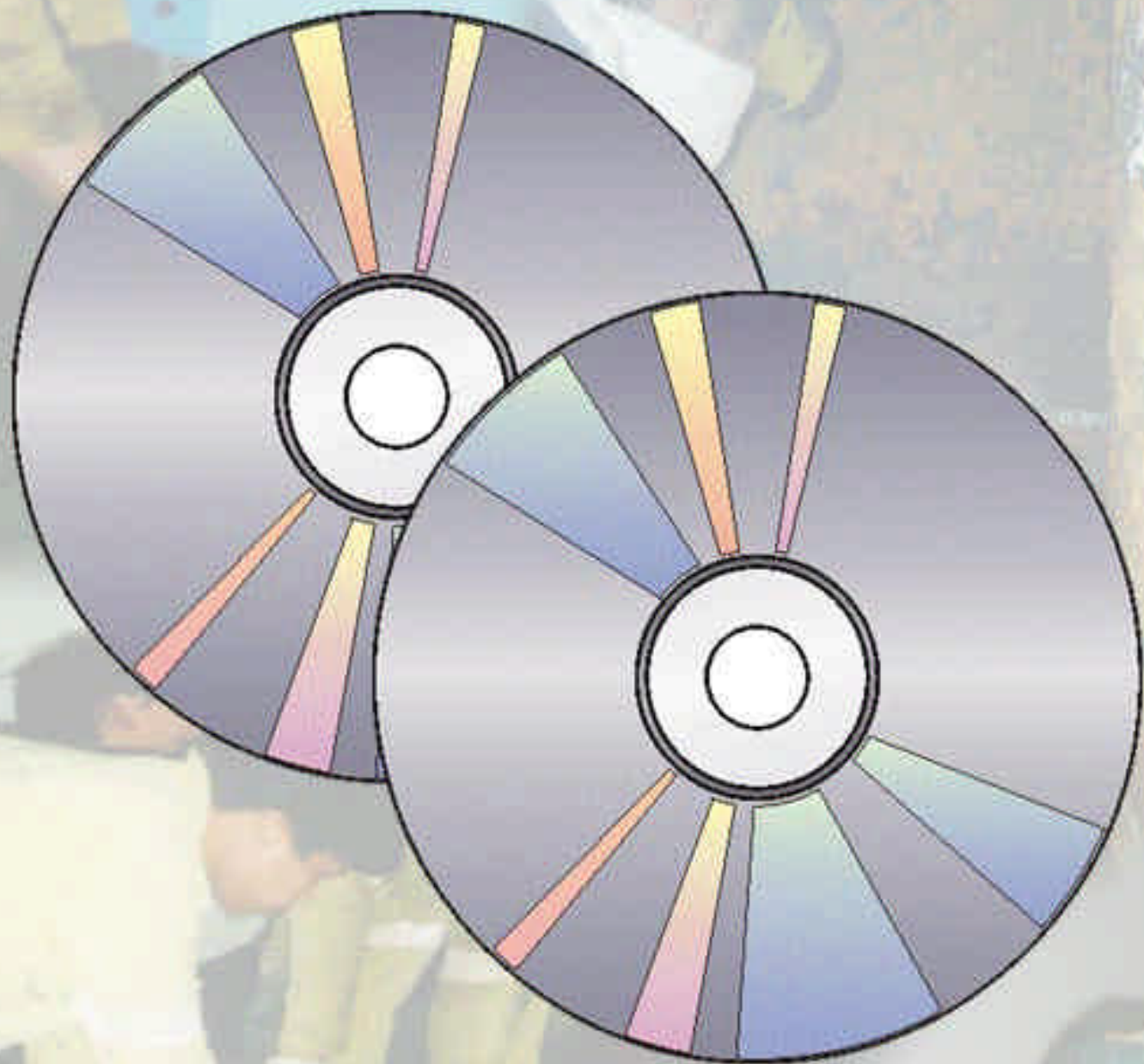


What Seafarers think of CBT

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Background

This paper constitutes the first report from an international study of computer-based training (CBT) undertaken by collaborators in the Philippines, Singapore, Spain, and UK. The collaboration between the Philippine Merchant Marine Academy (PMMA) Maritime Academy of Asia-Pacific (MAAP), Singapore Maritime Academy (SMA), University Polytechnic of Catalunya (UPC), and Cardiff University (SIRC) was facilitated by the support of the ASEAN-EU University Network Programme (AUNP) which we gratefully acknowledge.

There is a growing body of literature that supports the idea that computer based learning (computer based training) is an effective route for education and training. Much of the research supporting this argument has been undertaken within the field of medical education and training (Mehrabi, *et al.*, 2000; Lyons, *et al.*, 1992). For example, Mehrabi, *et al.* (2000) looked at the effectiveness of CBT programs for training surgical students, and found that the CBT improved learning effectiveness by 15-20% when compared to traditional methods.

Findings from other industries also seem to support this positive view of CBT. Kavanagh (1998) suggests that CBT may increase the retention of information by up to 40% compared to traditional classroom based methods. Similarly, Hall (1995) in a study of a mixed group of employees (within the steel and fast food industries) reported both an increase in the retention of information, as well as an improvement in job performance, following the use of CBT.

However, not all studies have found such conclusive evidence for the effectiveness of CBT. Dominguez and Ridley (1999) compared the effectiveness of web-based courses with traditional training, such as lectures, and found no significant differences in learning outcomes. Walker and Harrington (2004) similarly found that CBT was as effective as instructor-led workshops designed to train nursing facility staff about fire safety (but not necessarily more so). Some suggest that CBT is less effective than traditional instructor-led training (Cooper 2001; Terry 2000).

These contested findings may be attributed to different levels of CBT effectiveness according to the nature of what is being taught. For example, studies have shown that CBT is more effective than instructor-led classes in relation to knowledge acquisition and retention (Harrington and Walker, 2003b; Kaupins, 2002). However, it is less successful for interpersonal skill development (Kaupins, 2002) and practical 'hands on' tasks for which training is required (Harrington and Walker, 2003a; Allen, 1996). This has therefore led to some authors concluding that although CBT may be an effective teaching route, it may not be an appropriate method for teaching all things in all contexts (Harp, *et al.*, 1998; Hobbs and More, 1997; Steadman, 1994). Some authors therefore advise that care should be taken when choosing methods of training to make sure it is appropriate for the identified need (Newstrom, 1980) and some advocate that a mixture of teaching methods provides the best set of learning outcomes in any circumstances. They suggest that CBT should be used in combination with traditional classroom teaching as a complimentary and or supportive method (Cooper, 2001; Mehrabi, *et al.*, 2000; Kavanagh 1998; Velleman and More, 1996).

Notwithstanding any remaining doubts as to whether CBT is the most effective learning method available, the use of CBT does have a number of clear advantages. CBT allows more flexibility in learning as individuals can learn in their own time and at their own pace (Cooper, 2001, Harp et al 1998), and it may also be undertaken anywhere that is convenient, such as in the workplace (Kavanagh, 1998). The use of CBT also has a number of economic advantages. Studies have shown that training times, and costs, may be reduced by using CBT (Allen, 1996; Maul and Spotts, 1993; Harper et al 1998). Allen, *et al.* (1996) suggest that a reduction in training time of between 35-45% can be achieved by CBT as compared with traditional instructor-led methods (with equivalent or better learning outcomes). The flexibility to undertake CBT training anywhere may also mean that accommodation and travel costs which are often associated with classroom based vocational training are reduced Kavanagh (1998).

Certainly, it would seem these advantages pertain in the shipping industry where CBT has taken off as a mode of training. Today, computer based training packages are increasingly found aboard as well as in shore-side training establishments (Lloyd's List, 2005a; Lloyd's List, 2005b; Grey, 2005). However, there is little in the public domain that documents the experience of the end users of these products; seafarers themselves.

What this research attempted to do was to reveal some of the experiences of seafarers in relation to CBT as well as their perceptions of, and attitude to, CBT on board. Using an interviewer administered questionnaire (structured interview) undertaken in Spain, UK, Singapore, Philippines, and aboard some ships on passage, the research explored seafarers' experiences and approaches to CBT on board canvassing their opinions and attempting to gain an understanding of whether they found CBT a useful tool in training or a pointless imposition on their time (or shades in between).

The paper describes the distribution of the sample before outlining the main findings from the study. In outlining the results, the paper indicates where we have found statistically significant differences between the responses of different groups of seafarers (e.g. older seafarers compared to younger ones) as well as giving the overall picture in terms of attitudes. Significance levels and the tests we have employed are reported in brackets. The test used appears first, then the degrees of freedom, and then the significance value. The value 0.05 was held to be the cut off point for significance; values equal to, or smaller than, 0.05 were therefore regarded as significant. In interpreting significance results the rule of thumb is that the smaller the significance value the more significant the result. Thus significance levels of 0.00 are regarded as highly significant, results of 0.05, for our purposes here, are regarded as significant and those of 0.5, for example, are not treated as significant.

Sample profile

A total of 469 active seafarers took part in the research.

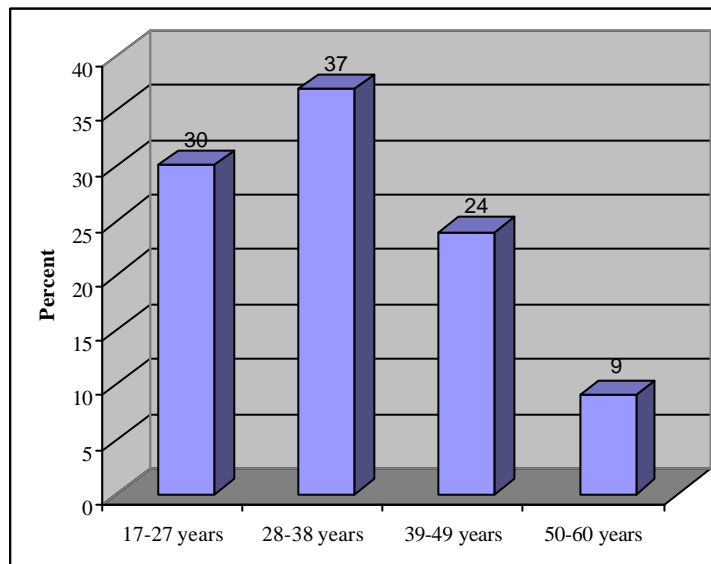
Within the sample, seafarers were represented in reasonable numbers across all age groups (see Figure One). A smaller proportion of the sample (9%) than we would have hoped for was aged 50 or over and we did not have any participants who were

older than 61. When we compare this to the age profile of seafarers across the globe (using the SIRC global labour market survey data based on real crew lists) we find that our CBT study sample would seem to over-represent seafarers aged 17-27 and slightly over-represent seafarers aged 28-38 whilst under-representing older seafarers aged 39 + (see Table 1 below).

Table 1: Comparison of age profile between SIRC crew list dataset and CBT study sample

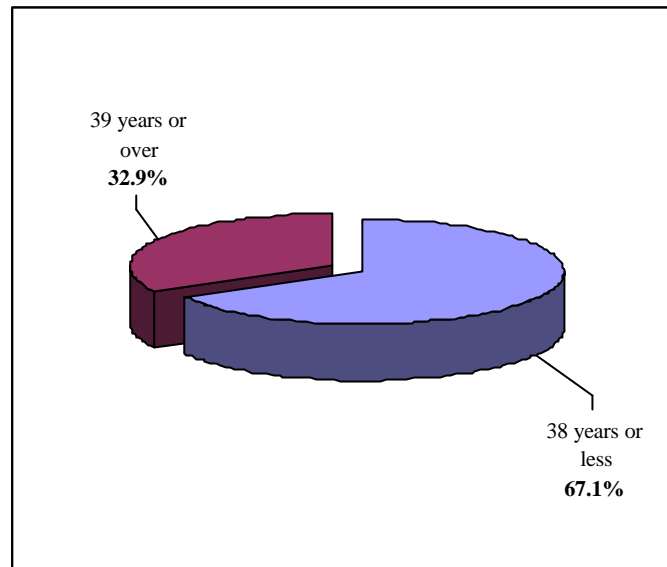
Age group	% in crew list data	% in CBT study sample
17-27	17	30
28-38	35	37
39-49	31	24
50-60	15	9
61+	1	0

Figure 1: Age Distribution



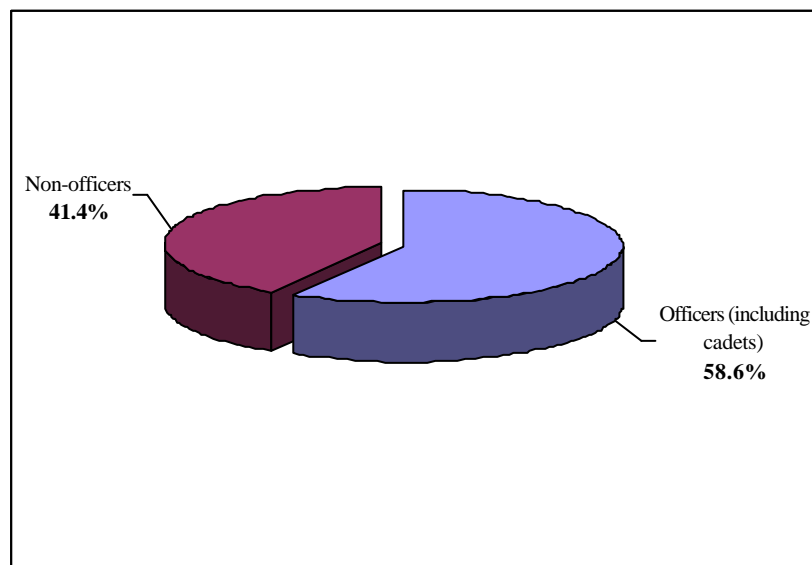
For the purpose of interpretation we have sometimes analysed our data using a re-coded age variable which is considered to represent older (39+) and younger (17-38) seafarers. Using this age division we can see that we have 67% of the sample in the 'younger' category (see Figure Two) as compared with 52% of the sample in the SIRC crew list dataset which was far more robust and should be considered a far better guide as to the age profile of the global seafarer population. This over-representation of younger seafarers should be considered carefully where we see significant differences in our results by age. Where younger seafarers have a significantly different attitude to older seafarers they may skew the overall picture given by our data which should be borne in mind in any interpretation of the results.

Figure 2: Age Distribution (re-coded)



In terms of the rank of individuals taking part in the survey similar proportions of participants were officers and ratings (when cadets were excluded). When cadets were counted as officers, officers made up approximately 59% of the sample (see Figure 3). A comparison with the picture aboard tankers (the ship type aboard which the largest single proportion of our seafarers worked) as represented in the SIRC crew list dataset, reveals that ratings are under-represented in our CBT sample. The crew list data suggests that aboard tankers, of various sizes, the average number of officers is in the region of seven whilst the average number of ratings is just over nine. This under-representation of ratings (over-representation of officers) should be taken into account in the interpretation of the data, particularly where significant differences are found between officers and non-officers.

Figure 3: Rank Distributions



There were a considerable number of nationalities represented in the sample and for the purposes of analysis these were therefore re-coded (re-grouped) by region. Due to the very high numbers of Filipinos in the sample we also re-coded the data as Filipino and non-Filipino in order to check the significance of our results (to check for a strong nationality bias in effect). Using these categories we found that approximately 12% of the sample carried European nationality whilst the sample was dominated by seafarers from Asian nations (see Figure 4). Fifty-nine percent of the total sample was found to hold Filipino nationality (see Figure 5) which constitutes an over-representation of seafarers when the sample shape is compared with data from the SIRC global labour market survey which suggests that less than one third of the world's seafarers are from the Philippines (approximately 28%).

Figure 4: Nationality Distribution (re-coded by region)

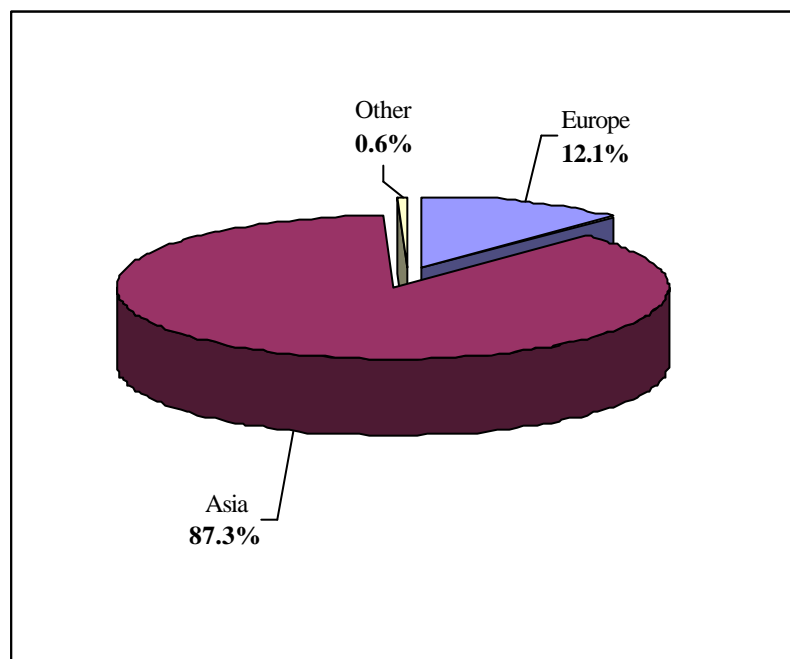
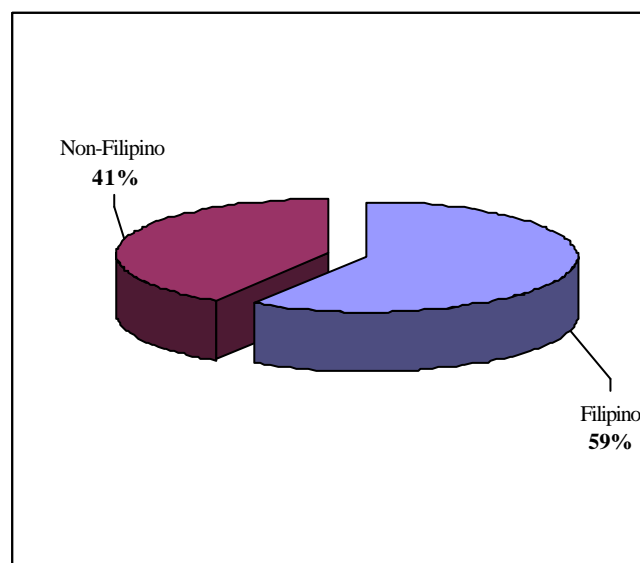


Figure 5: Nationality Distributions (re-coded by Filipino vs. non-Filipino)

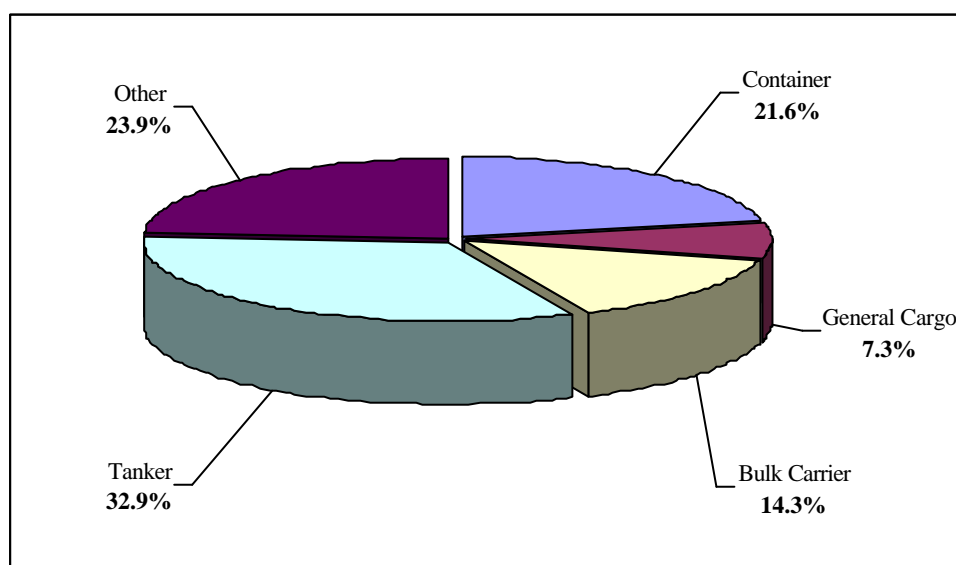


There was a considerable range of ship-type in the sample (see Table 2 below) and for analytic purposes these had to be re-coded into the main types with a rather large 'other' category (see Figure 6). Tankers were the most significant group (32.9%) followed by containers (21.6%) and bulk carriers (14.3%).

Table 2: Ship types

<i>Ship type</i>	<i>Present sample</i>	<i>World Fleet Statistics, 2003</i>
Container	21.6%	4.7%
General Cargo	7.3%	25.2%
Bulk Carrier	14.3%	9.9%
Tanker	32.9%	17.3%
Other	23.9%	42.9%
<i>Total</i>	100.0%	100.0%

Figure 6: Pie chart showing Ship Types (re-coded)



When we compare this with world fleet data we find that tankers are over-represented in our sample (32.9 as opposed to 17.3%) along with container vessels (21.6 as opposed to 4.7%) and bulk carriers (14.3 as opposed to 9.9%). General cargo vessels and the 'other' category are under-represented (7.3 as opposed to 25.2%, and 23.9 as opposed to 42.9% respectively). However, these differences may also relate to the differences in the process of categorisation of vessel types and should not be dwelt upon in any detail.

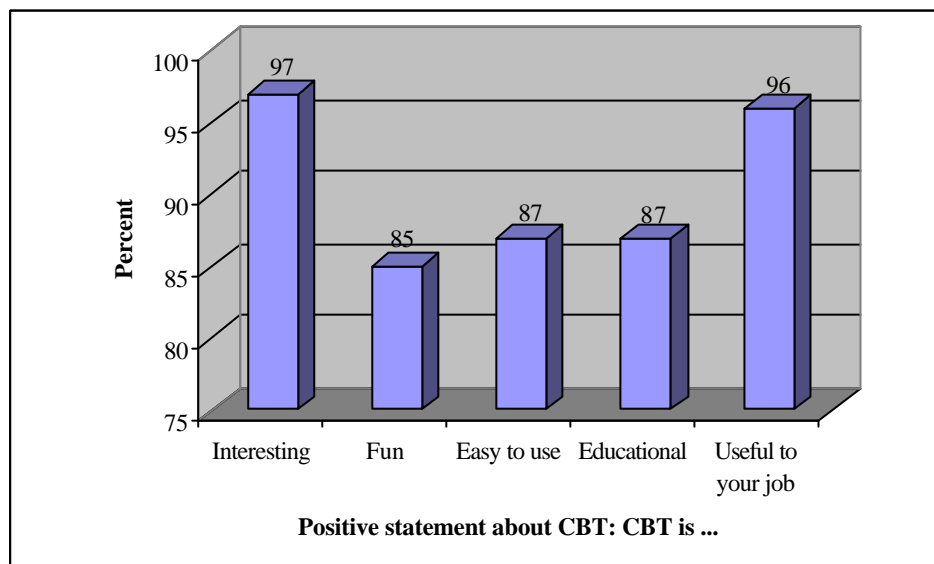
Whilst not fully comprehensive these characteristics were the most notable ones in relation to the sample. On the whole the sample was not alarmingly skewed in any respect except perhaps for the considerable over-representation of Filipino seafarers. Wherever relevant we have compensated for this by checking for a nationality bias in relation to relevant findings.

Findings

The general view that seafarers expressed about CBT

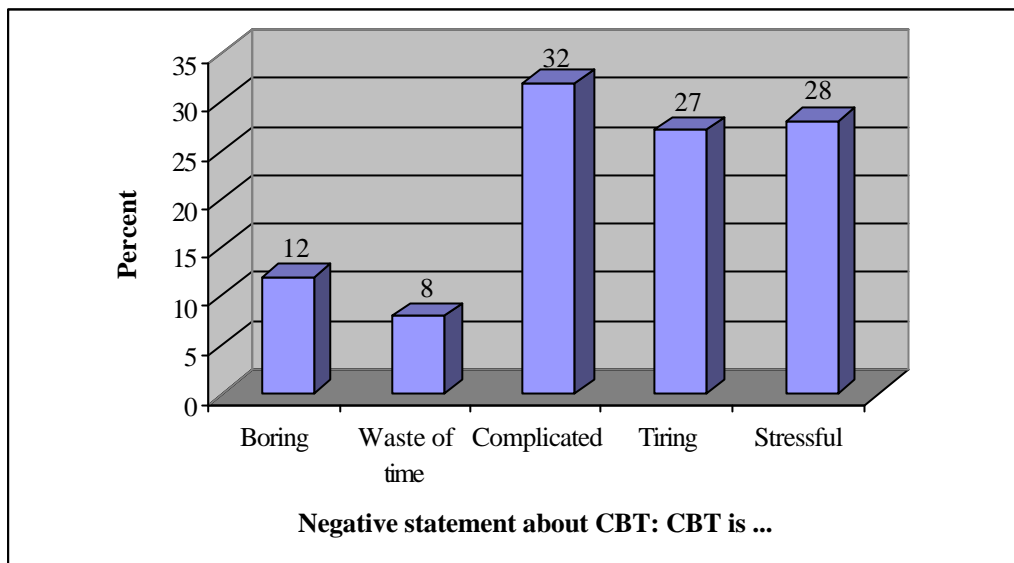
Seafarers were offered a number of positive and negative statements about CBT which they were invited to agree or disagree with in order to check their perceptions of it. Ninety-two percent of the expressed responses to positive statements about CBT were in agreement whilst only 21% of the expressed responses to negative statements about CBT were in agreement. This indicates that seafarers held a broadly positive view of CBT. Ninety-seven percent agreed that it was interesting, 85% thought it was fun, 87% believed it was easy to use, 97% agreed that it was educational, and 96% felt it was useful to their job (see Figure 7).

Figure 7: The percentage of seafarers agreeing with positive statements



In terms of negative attitudes, 12% of our sample felt that CBT was boring, 8% felt it was a waste of time, 32% considered CBT to be complicated, 27% felt it was tiring, and 28% considered it to be stressful (see Figure 8).

Figure 8: The percentage of seafarers agreeing with negative statements



When we analysed this data further we found some interesting variations. Significant differences were found between younger and older seafarers with younger seafarers finding CBT easier ($\chi^2=19.554$, d.f.=1, $p=.000$), less complicated ($\chi^2=12.389$, d.f.=1, $p=.000$) and less stressful ($\chi^2=9.520$, d.f.=1, $p=.002$) as compared to older seafarers.

We also found significant differences in the attitudes of seafarers according to the level of comfort with computers that they reported. Those who were more comfortable with computers described CBT as more interesting ($\chi^2=58.486$, d.f.=2, $p=.000$), more fun ($\chi^2=6.845$, d.f.=2, $p=.033$), more educational ($\chi^2=48.614$, d.f.=2, $p=.000$), more useful ($\chi^2=32.916$, d.f.=2, $p=.000$) and easier ($\chi^2=25.542$, d.f.=2, $p=.000$). However seafarers who were more comfortable with computers also reported that CBT was more stressful than seafarers who described themselves as less comfortable with computers ($\chi^2=12.729$, d.f.=2, $p=.002$).

Those who were less comfortable with computers were more likely to say that CBT was a waste of time ($\chi^2=21.881$, d.f.=2, $p=.000$) and more complicated ($\chi^2=11.496$, d.f.=2, $p=.003$) than seafarers describing themselves as more comfortable with computers.

Seafarers who had not experienced compulsory CBT on board were less likely to suggest that CBT was boring ($\chi^2=10.940$, d.f.=1, $p=.001$), more likely to describe it as complicated ($\chi^2=15.673$, d.f.=1, $p=.000$) and more likely to say it was useful to their job ($\chi^2=5.270$, d.f.=1, $p=.022$) than seafarers who had experienced compulsory CBT aboard.

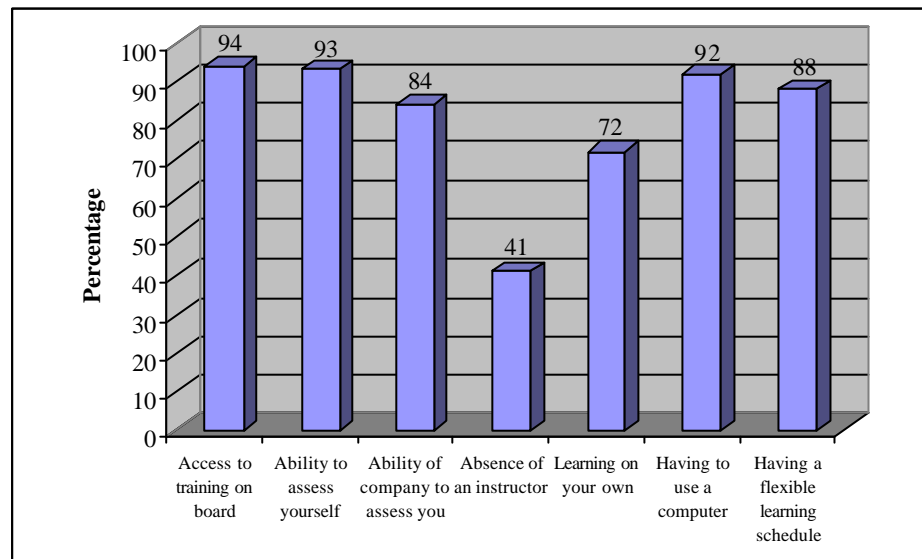
This suggests that younger seafarers and seafarers who were comfortable with computers had a significantly more positive attitude to CBT than older seafarers and those who reported that they were less comfortable with computers. Seafarers who had no experience of compulsory CBT aboard had a more positive attitude towards CBT than those who had experienced compulsory CBT (interestingly they were less likely to see it as boring and more likely to see it as useful to their jobs), however,

they tended to regard CBT as more complicated than seafarers who had been forced to participate in CBT aboard.

Seafarers' perceptions of the advantages and disadvantages of CBT

Seafarers were asked whether they regarded a series of potential CBT characteristics on board ship as advantageous or disadvantageous. Ninety-four percent suggested that access to training on board was a beneficial feature of CBT, 93% thought this was true of the ability to assess yourself, 84% believed that the ability of the company to assess you was a potentially beneficial feature of CBT. Less than half of the participants believed that the absence of an instructor was a positive characteristic of CBT (41%), 72% felt that learning on your own was an advantage associated with CBT, 92% saw having to use a computer as a positive aspect of CBT and 88% felt that a the flexible learning schedule offered by most CBT was beneficial (see Figure 9).

Figure 9: Factors seen as advantageous by seafarers



There were some interesting differences of statistical significance found between Filipinos and non-Filipinos in the sample. Non-Filipinos were more likely to see the ability to assess “yourself” as an advantage of CBT ($\chi^2=5.263$, d.f.=1, $p=.022$), whilst Filipinos were more likely to see the ability of the company to assess “you” as an advantage of CBT ($\chi^2=7.678$, d.f.=1, $p=.006$).

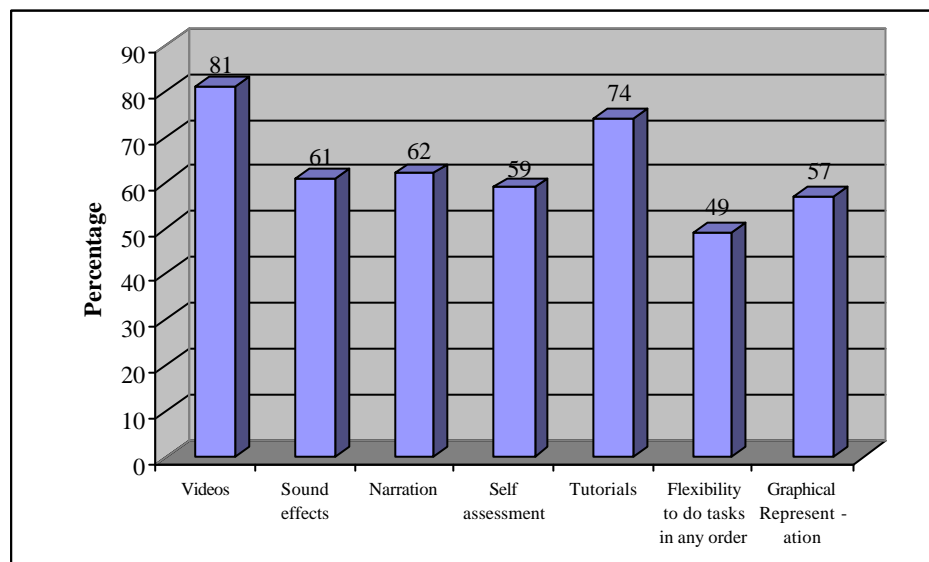
Perhaps surprisingly Filipinos were also more likely than non-Filipinos to see the absence of an instructor as an advantage of CBT ($\chi^2=3.879$, d.f.=1, $p=.049$). This suggests that (given the sample skew in terms of higher than proportionate numbers of Filipinos) the overall result here (41%) overestimates the proportion of seafarers across the whole workforce who see learning without an instructor as an advantage of CBT. It would seem that for some reason Filipinos enjoy learning without an instructor more than other nationalities and therefore welcome this aspect of CBT. It

is interesting to ponder on why this might be but the answer is regrettably not available from our results.

Features seafarers wanted to see included in CBT

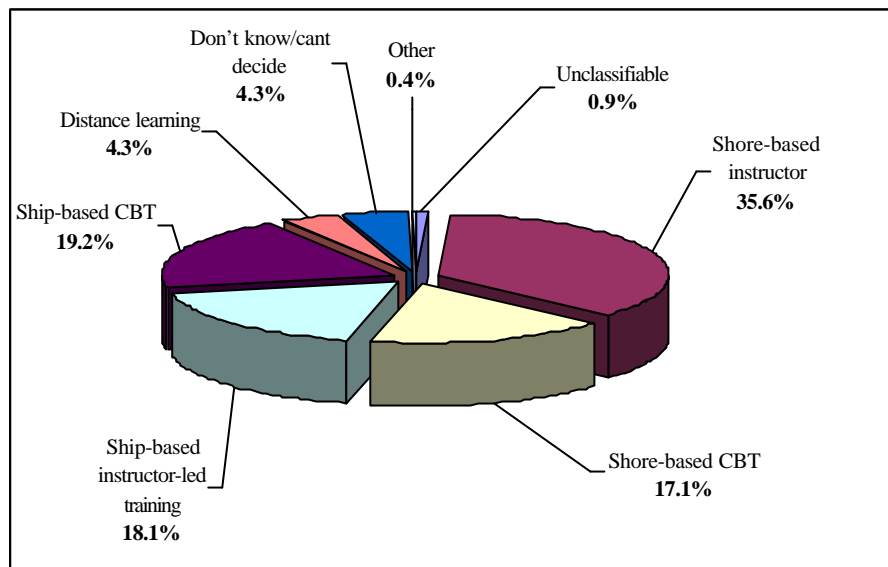
We asked seafarers what features they would like CBT to include, ideally. Videos (video clips) were the most popular item chosen (81% of seafarers chose this item), followed by tutorials (74%), narration (62%), sound effects (61%), self-assessment (59%), graphical representations (57%), and the flexibility to do tasks in any order (49%) (see Figure 10). In some respect these results are surprising as many features perhaps score lower than expected. One explanation for the high demand for the incorporation of video clips as compared with other features may be the unfamiliarity of some respondents with the potential of CBT (those with and without direct experience of CBT answered this question) and their probable familiarity with training videos (training videos are frequently used in training aboard and ashore).

Figure 10: The features seafarers wanted CBT to include



Seafarers' preferred forms of training

Seafarers were asked to describe their preferred form of training. Over half of the participants (53.7%) expressed a preference for instructor-led training (35.6% preferred shore-based instructor led training whilst 18.1% preferred ship-based instructor led training). Just over 36% of our sample favoured CBT either ashore (17.1%) or aboard (19.2%), whilst distance learning was favoured by only 4.3% of respondents (see Figure 11)

Figure 11: Preferred form of CBT training

We found a significant difference here in the views of Filipinos and non-Filipinos in their preferences for specific forms of training ($\chi^2=31.705$, d.f.=6, p=.000). Therefore, the two nationality groups were examined individually in respect to the preferred form of training.

Table 3: Preferred form of training by nationality

<i>Preferred form of training</i>	<i>Filipino</i>	<i>All other</i>
Shore-based instructor-led classes	30.4%	44.6%
Shore-based CBT	18.5%	14.1%
Ship-based instructor-led training	14.4%	23.9%
Ship-based CBT	25.6%	10.9%
Distance Learning	5.6%	2.7%
Other	0.0%	1.1%
I don't know/ cannot decide	5.6%	2.7%
<i>Total</i>	100.0%	100.0%

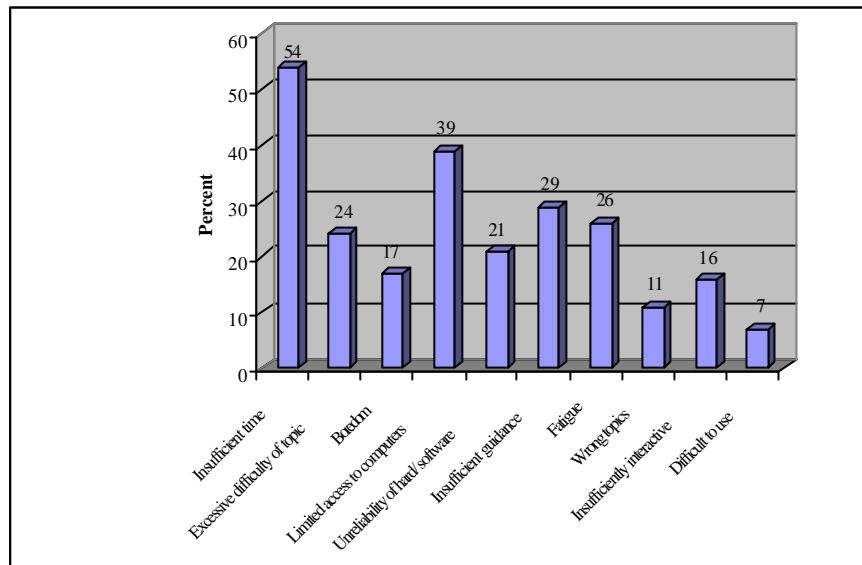
Statistical analysis of the individual forms of training by nationality showed that non-Filipinos were more likely to prefer ship and shore-based instructor-led training ($\chi^2=8.340$, d.f.=1, p=.004, $\chi^2=5.865$, d.f.=1, p=.015) than Filipinos and that Filipinos were more likely to prefer ship based CBT than non-Filipinos ($\chi^2=16.281$, d.f.=1, p=.000).

Seafarers' experiences of problems associated with CBT aboard ship

Seafarers were asked about the problems they may have experienced in undertaking CBT aboard. Over half of the sample identified insufficient time as a problem

associated with this form of on board training. Thirty-nine percent identified limited access to computers as a difficulty, 29% suggested there was insufficient guidance associated with CBT, 26% believed that fatigue was a problem with CBT, 24% felt that topic difficulty was a problem with CBT, 21% felt that soft/hardware unreliability was a problem, 17% identified boredom as an associated problem, 16% believed CBT was insufficiently interactive, 11% felt that it covered the wrong topics and 7% identified CBT as difficult to use (see Figure 12).

Figure 12: Problems associated with CBT training



There were some interesting age differences in the results. Older seafarers, aged 39 and over, were more likely to say they had insufficient time for CBT on board ($\chi^2=3.992$, d.f.=1, $p=.046$). Whilst younger seafarers were more likely than older seafarers to report that access to computers was a problem in using CBT ($\chi^2=5.103$, d.f.=1, $p=.024$).

There were also some interesting differences in the results for Filipinos and for non-Filipinos. Non-Filipinos were more likely to say that CBT was boring than Filipinos ($\chi^2=11.492$, d.f.=1, $p=.001$). Non-Filipinos were more likely than Filipinos to say that CBT caused fatigue ($\chi^2=8.517$, d.f.=1, $p=.004$), and non-Filipinos were more likely than Filipinos to say that CBT was difficult to use ($\chi^2=6.726$, d.f.=1, $p=.010$).

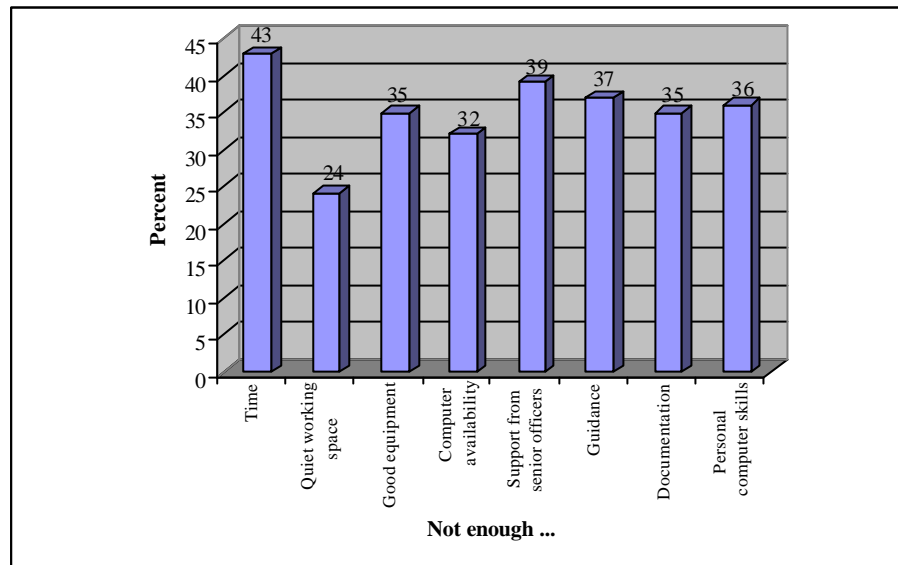
NB Non-Filipinos had less experience of CBT than Filipinos, with only 40.4% of non-Filipino's having used CBT for over 100 hours, in comparison to 59.6% of Filipinos who had used CBT for over 100 hours.

Seafarers with more hours experience of CBT on board (40 hours or more) were more likely than seafarers inexperienced in terms of CBT use on board to say that a problem of CBT was the excessive difficulty of topics covered ($\chi^2=9.340$, d.f.=1, $p=.002$).

Seafarers were then asked if they had ever experienced any of the following in relation to using CBT on board: insufficient quiet working space, insufficient quality of equipment (hardware), insufficient computer availability,

insufficient support from senior officers, insufficient guidance, insufficient documentation, and insufficient computer skills (personal skills). Whilst the majority of respondents did not experience such problems the numbers who had were significant ranging from just under a quarter to just under a half of the sample depending on the specific difficulty identified. Not enough time was cited most often as a problem by respondents (43% identified this as a difficulty), whilst insufficient quiet working space was cited least often as a problem (but was nevertheless cited as a problem by 24% of all respondents) see Figure 13.

Figure 13: Negative experiences of CBT in the past



There were some interesting differences identified between those for whom CBT had previously been compulsory aboard ship and those for whom it had not. People for whom CBT had been compulsory were more likely to say that they had enough time to do CBT on board ($\chi^2=9.451$, d.f.=1, $p=.002$) and were more likely to say that they had enough quiet working space ($\chi^2=8.646$, d.f.=1, $p=.003$) than those for whom CBT had not been compulsory.

People for whom CBT had been compulsory were also more likely to say that they had good enough equipment ($\chi^2=7.317$, d.f.=1, $p=.007$), computer availability ($\chi^2=7.444$, d.f.=1, $p=.006$), guidance ($\chi^2=11.902$, d.f.=1, $p=.001$), documentation ($\chi^2=10.388$, d.f.=1, $p=.001$), personal computer skills ($\chi^2=12.978$, d.f.=1, $p=.000$), and support from senior officers for CBT on board ($\chi^2=7.571$, d.f.=1, $p=.006$).

Thus it would seem that where CBT had been compulsory on board, companies had been more likely to provide the resources in support of its use than where it was not compulsory (where companies were less likely to have provided resources in support of its use).

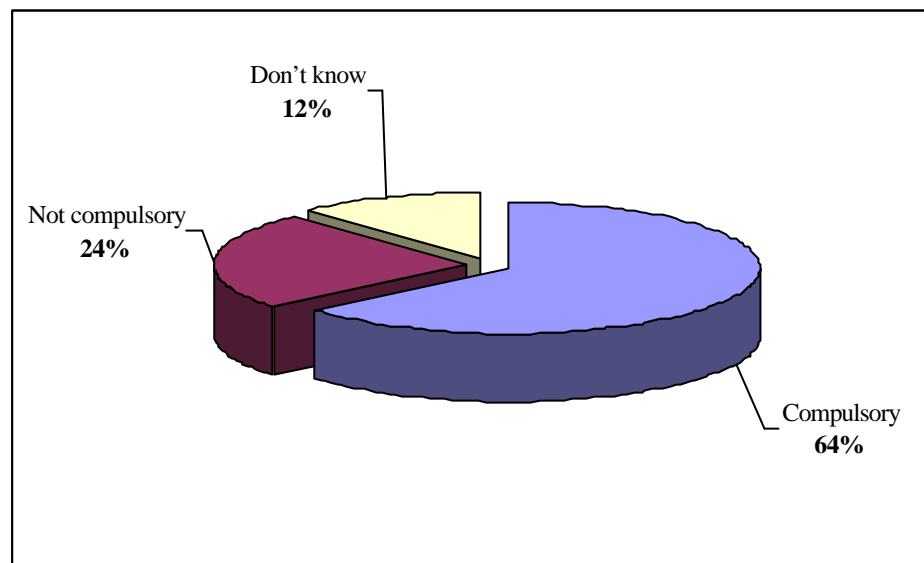
A difference in the experiences of officers and non-officers was also identified here. Non-officers [petty officers and ratings] were more likely to report that they did not have sufficient personal computer skills for CBT than officers [senior officer, junior officers and cadets] ($\chi^2=8.951$, d.f.=1, $p=.003$). This significant result is still found

even when cadets (who are generally young and likely to be more computer literate as a consequence) are excluded ($\chi^2=8.358$, d.f.=1, $p=.004$).

Attitudes towards compulsion

Seafarers were asked whether CBT should be made compulsory or not. Surprisingly perhaps a majority (although not an overwhelming majority at 64%) felt that CBT should be made compulsory (see Figure 14).

Figure 14: Seafarers opinions on whether CBT should be made compulsory



We found statistically significant differences between seafarers who thought CBT should be made compulsory and those who didn't in terms of their past experience of CBT (generally better in terms of the provision of resources etc), their comfort with computers, their attitudes towards CBT and whether or not they had previously experienced compulsory CBT aboard.

Thus, those who thought CBT should be made compulsory indicated that they had previously experienced enough time ($\chi^2=4.520$, d.f.=1, $p=.034$), quiet working space ($\chi^2=6.936$, d.f.=1, $p=.008$), support from officers ($\chi^2=3.872$, d.f.=1, $p=.049$) and documentation ($\chi^2=5.752$, d.f.=1, $p=.016$) to undertake CBT on board.

Those who thought CBT should be made compulsory felt more comfortable using computers than those who didn't think it should be made compulsory ($\chi^2=5.320$, d.f.=1, $p=.021$).

Seafarers who believed CBT should be made compulsory were more likely to believe it was easy to use ($\chi^2=13.432$, d.f.=1, $p=.000$), less likely to believe that it was complicated ($\chi^2=9.451$, d.f.=1, $p=.002$), more likely to see CBT as useful to their job ($\chi^2=5.163$, d.f.=1, $p=.023$), less likely to believe CBT was tiring ($\chi^2=7.890$, d.f.=1, $p=.005$), less likely to believe that CBT was stressful ($\chi^2=4.645$, d.f.=1, $p=.031$) and more likely to believe it was fun ($\chi^2=15.115$, d.f.=1, $p=.000$) than seafarers who did not state a desire for it to be made compulsory.

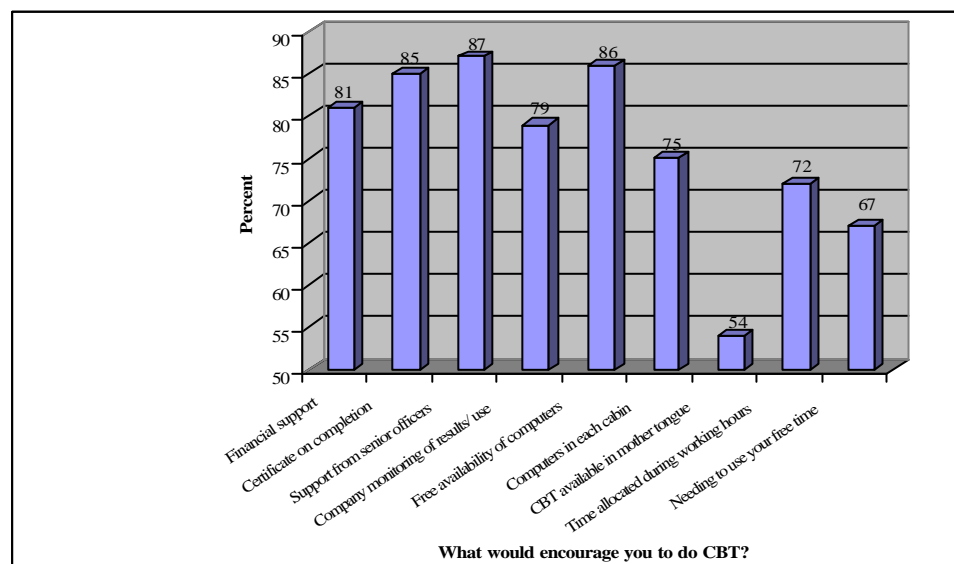
People who had experienced compulsory CBT on board were more likely to believe that it should be compulsory than people who had not previously experienced compulsory CBT on board ($\chi^2=13.259$, d.f.=1, p=.000).

It seemed that those who favoured compulsion were also more likely to identify a range of factors that would encourage them to use CBT on board including rewards in the form of certificates/financial incentives. Thus it seemed they were willing for CBT to be made compulsory but they also felt that employers should provide support, encouragement, and resources to back this up. Thus, seafarers who thought CBT should be compulsory were more likely than those who did not to believe that financial incentives ($\chi^2=8.033$, d.f.=1, p=.005), certificates on completion ($\chi^2=6.009$, d.f.=1, p=.014), support from senior officers ($\chi^2=8.287$, d.f.=1, p=.004), company monitoring of results ($\chi^2=18.257$, d.f.=1, p=.000), needing to use free time for CBT ($\chi^2=9.589$, d.f.=1, p=.002) would encourage them to use CBT.

Incentives

Seafarers were asked what would encourage them to use CBT on board. Whilst financial incentives were identified by most seafarers as encouraging them to use CBT (81% ticked this option), other incentives were identified by greater numbers of seafarers as encouraging. Eighty-seven percent ticked support from senior officers as encouraging, 86% suggested that the free availability of computers in public spaces would encourage them and 85% of respondents said that gaining a certificate on completion of CBT would encourage them to undertake it on board. Having CBT available in their mother tongue was the least often ticked factor regarded as encouraging in terms of CBT on board (see Figure 15).

Figure 15: Factors that would encourage seafarers to use CBT



There were some significant differences identified in the views of Filipinos and non-Filipinos when answering this question. Non-Filipinos were more likely than Filipinos to be encouraged to do CBT by a financial incentive ($\chi^2=19.131$, d.f.=1, p=.000). Non-Filipinos were more likely to be encouraged by free availability of public

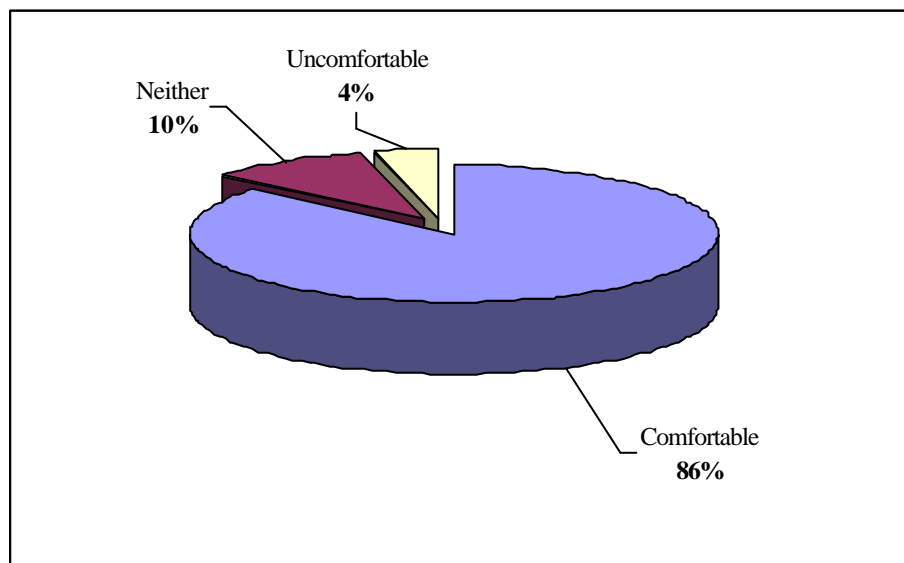
computers than Filipinos ($\chi^2=5.354$, d.f.=1, $p=.021$). Non-Filipinos were more likely to be encouraged by computers being available in each cabin than Filipinos ($\chi^2=7.674$, d.f.=1, $p=.006$).

Whereas, Filipinos were more likely to be encouraged to do CBT by company monitoring than non-Filipinos ($\chi^2=5.827$, d.f.=1, $p=.016$) and Filipinos were more likely to be encouraged by needing to use their free time for CBT than non-Filipinos ($\chi^2=15.993$, d.f.=1, $p=.000$). That any seafarers would be encouraged to undertake CBT by having to use their free time to do so was a surprising finding and the issue of work and free time use for CBT is one that we return to later.

Comfort with computers

A very high proportion of our sample suggested they were comfortable with computers. This could imply a reluctance to admit to feeling uncomfortable with computers but it is probably more likely to reflect the bias in our sample towards younger seafarers and towards officers. Eighty-six percent of respondents said they were comfortable or very comfortable with computers, whilst 10% said they were neither comfortable nor uncomfortable and only 4% suggested they felt uncomfortable or very uncomfortable using computers (see Figure 16).

Figure 16: Rating of Comfort with computers



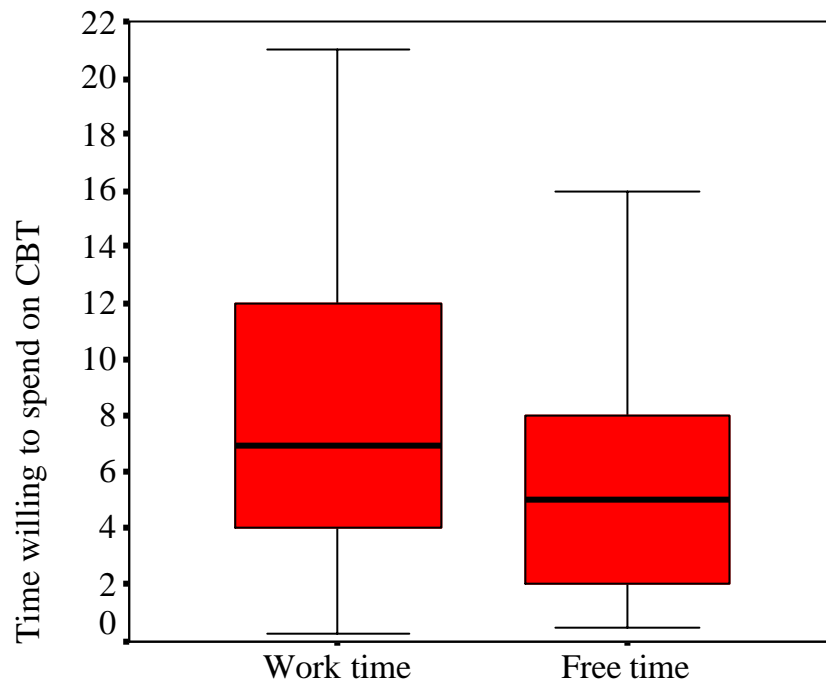
There was a significant age difference found in the results which identified younger seafarers being more comfortable with computers than older seafarers ($\chi^2=5.538$, d.f.=1, $p=.019$).

Time willing to dedicate to CBT

Perhaps the most surprising of the results were found in relation to the amount of time seafarers were willing to spend on CBT aboard ship. This was higher than we had anticipated both in relation to working time and free time. On average seafarers reported that they were willing to spend 9 hours (standard deviation $d=8.7$ hours) per

week of their working time on CBT and 6.4 hours (standard deviation $d=6.0$ hours) per week of their free time on CBT. The standard deviation in the responses to this question was quite high but is higher in relation to the responses to working time than free time. This is illustrated in Figure 17 which shows the range of responses (the black line) minus outliers, the clusters where 50% of responses occurred (the red boxes) and the thick black line indicates the median value.

Figure 17: Work and free time seafarers would be willing to put into CBT



N.B Outliers have been removed to more clearly illustrate the time seafarers were willing to put into CBT.

We then statistically compared the amount of work and free time seafarers were willing to spend on CBT aboard ship. Not all respondents gave answers to both these questions and therefore in order to conduct a paired sample t-test these have had to be excluded (changing the mean values from those stated above). Seafarers were found to be willing to spend significantly less time on CBT during their free time compared to during their working time (Paired $t=3.110$, $d.f.=322$, $p=.002$). They indicated that they were willing to spend 7.9 hours (s.d.=7.4) on CBT in their work time, and 6.6 hours (s.d.=6.1) on CBT in their free time.

However further analysis indicated that this difference was significant amongst Filipino seafarers (Paired $t=4.188$, $d.f.=207$, $p=.000$), but not amongst other nationalities (Paired $t=-.301$, $d.f.=110$, $p=.764$). Filipinos were willing to spend an average of 8.2 working hours (s.d.=7.6) and 6.0 hours of their free time (s.d.=5.2) on CBT, whereas non-Filipinos were willing to spend an average of 7.5 working hours (s.d.=7.1) and 7.7 hours (s.d.=7.5) of their free time on CBT.

Significant differences in the responses of seafarers to the question concerning the amount of work time they were willing to dedicate to CBT

Those seafarers who were willing for companies to monitor their progress were on average willing to put more hours into CBT during work time ($t=2.655$, $d.f.=367$, $p=.008$). They indicated that they were prepared to put an average of 9.3 hours [$s.d.=8.7$] into CBT during work time, compared with an average of 5.6 [$s.d.=4.4$] hours per week for those who were not willing for companies to monitor them.

There was no significant difference between officers and non-officers in terms of the average number of hours they were willing to spend in their work time on CBT ($t=0.884$, $d.f.=381$, $p=.377$). However, there was a significant difference between cadets and all other ranks in terms of the average number of hours they were willing to spend on CBT during working hours ($t=-2.972$, $d.f.=381$, $p=.003$), with cadets being willing to spend an average of 12.4 hours ($s.d.=11.6$), in comparison to other ranks which were only willing to spend on average of 8.3 hours ($s.d.=8.0$).

Non-Filipinos were willing to put more working time into CBT than Filipinos ($t=-2.351$, $d.f.=390$, $p=.019$), with the average number of hours they were willing to put into CBT being 10.2 hours ($s.d.=10.3$) and 8.1 hours ($s.d.=7.3$) respectively.

Seafarers aboard anchor handlers, ferries, and Ro Ros were prepared to spend significantly more time on CBT during working hours than seafarers aboard all other ship types in our sample ($t=-5.465$, $d.f.=394$, $p=0.000$). Those on anchor handlers, ferries, Ro-Ro's etc were willing to spend a mean of 17.7 hours ($s.d.=18.7$) on CBT during their working time, compared to the other group who were only willing to spend 8.4 hours ($s.d.=7.2$).

NB There was a high level of standard deviation in the anchor handlers, ferries, Ro-Ros group in comparison to the all others group.

Surprisingly, seafarers aboard ships making one or more port call per day were willing to spend more work time on CBT than seafarers on ships making less than one port call ($t=-2.637$, $d.f.=385$, $p=.009$), indicating an average of 12.3 hours per day ($s.d.=13.0$) compared with 8.6 per day ($s.d.=8.0$).

Seafarers working less than an average of 8 hours per day in port were willing to spend less working time on CBT than seafarers working 8 hours or more in port ($t=-2.117$, $d.f.=394$, $p=.035$), with an average of 6.4 hours per week ($s.d.=6.9$) compared to 9.3 ($s.d.=8.9$) hours per week respectively.

NB Further analysis demonstrated no significant differences in terms of the nationality ($\chi^2=.223$, $d.f.=1$, $p=.637$) or rank ($\chi^2=.272$, $d.f.=1$, $p=.602$) of seafarers working less or more than 8 hours. However, seafarers working less than 8 hours were significantly more likely to be in the age group 39+ years than seafarers working more than 8 hours ($\chi^2=4.662$, $d.f.=1$, $p=.031$). Thus this finding may in fact be a reflection of age difference.

Seafarers who had experienced more than 100 hours of CBT were prepared to spend significantly more of their working time on CBT aboard than seafarers who had less than 100 hours experience of CBT ($t=2.970$, $d.f.=252$, $p=.003$), with an average of 11.6 hours ($s.d.=14.2$), and 7.7 hours ($s.d.=5.8$) respectively.

NB There was a high level of standard deviation in the group that had experience over 100 hours of CBT in comparison to those who had experienced fewer hours.

Significant differences in the responses of seafarers to the question concerning the amount of free time they were willing to dedicate to CBT

There was no significant difference in the amount of free time seafarers were prepared to spend on CBT between those who were willing and unwilling for the company to monitor their CBT progress ($t=.693$, $d.f.=333$, $p=.489$)

There was no significant difference between officers and non-officers in terms of the average number of hours they were willing to spend in their free time on CBT ($t=0.230$, $d.f.=347$, $p=.819$). Similarly, there was no significant difference between cadets and all other ranks in terms of the average number of hours they were willing to spend on CBT during free hours ($t=-1.359$, $d.f.=347$, $p=.175$).

Non-Filipinos were willing to put more free time into CBT than Filipinos ($t=-2.124$, $d.f.=349$, $p=.034$), indicating an average time of 7.3 hours ($s.d.=7.3$) as opposed to 5.9 hours ($s.d.=5.2$) respectively. This seems to cast doubt on an earlier finding that more Filipinos than non-Filipinos would be encouraged to do CBT on board by having to use their free time. It is highly suggestive of a misunderstanding (possibly by some of the interviewers) of the earlier question (in relation to encouragement).

There was no significant difference between the amount of time seafarers were willing to spend on CBT during free time between those aboard anchor handlers, ferries, and Ro-Ros compared to the other ship types in the sample ($t=-.262$, $d.f.=354$, $p=.793$).

Seafarers aboard ships making more than one port call per day were willing to spend less free time on CBT than seafarers on ships making less than one port call, with an average of 5.0 hours ($s.d.=5.6$) compared with 6.6 hours ($s.d.=6.1$). However statistically this was not found to be significantly different ($t=-1.424$, $d.f.=346$, $p=.155$).

Seafarers working 8 hours or more in port were willing to spend more free time on CBT than seafarers working less than 8 hours ($t=-2.676$, $d.f.=354$, $p=.008$), indicating that they would spend 6.7 hours on CBT ($s.d.=6.2$) and 4.0 hours on CBT ($s.d.=4.3$) respectively.

NB Further analysis demonstrated no significant differences in terms of the nationality ($\chi^2=.223$, $d.f.=1$, $p=.637$) or rank ($\chi^2=.272$, $d.f.=1$, $p=.602$) of seafarers working less or more than 8 hours. However, seafarers working less than 8 hours were significantly more likely to be in the age group 39+ years than seafarers working more than 8 hours ($\chi^2=4.662$, $d.f.=1$, $p=.031$). As indicated earlier this finding is therefore likely to reflect an age difference in the respondents.

There was no significant difference between those seafarers who had experienced more than 100 hours of CBT and those who had experienced less in terms of the average amount of free time they were prepared to spend on CBT ($t=.057$, $d.f.=236$, $p=.995$).

Seafarers who were comfortable with computers were prepared to spend more of their free time on CBT compared to those who were uncomfortable or neither comfortable or uncomfortable with computers ($t=2.845$, $d.f.=341$, $p=.005$), with those who were comfortable with computers who were willing to spend 6.8 (s.d.=6.4) hours of their free time on CBT compared to those who were not, being willing to spend only 4.1 hours (s.d.=2.8).

NB The significant result is lost if the neither comfortable or uncomfortable group is removed from the analysis ($t=1.753$, $d.f.=311$, $p=.081$), even though this group's mean falls between the two means of comfortable and uncomfortable. The means for the comfortable, neither, or uncomfortable groups are 6.8 hours (s.d.=6.4), 4.1 hours (s.d.=3.0), and 3.9 hours (s.d.=2.3) respectively.

Conclusion

On the whole the findings of this research are encouraging for those who support the use of CBT aboard ships. Seafarers had broadly positive views of CBT despite the fact that significant numbers of them had experienced problems (of time in particular but also of support from senior officers and a range of resources) in using CBT on board. Problems related not only to failures of companies or management in providing resources and reducing related difficulties such as fatigue, they related to manufacturers and designers of CBT as well. Seafarers identified both the wrong topic coverage and excessive difficulty in the CBT they had experienced as problems which suggests that there may be quality issues to address within CBT production. Nevertheless in spite of the difficulties identified, and whilst there was a general preference for instructor-led training, CBT was regarded as a preferred method of training by a significant number of seafarers, and proved particularly popular with Filipinos.

It was also encouraging that so many seafarers (86%) reported that they were comfortable using computers. It is obviously no surprise that younger seafarers were significantly more likely to be at ease with computers than older seafarers however when regarded as a whole the overall result is very positive given the increasing need for computer literacy on board. It is worthy of note however that despite this degree of comfort, 36% of seafarers reported that they had experienced insufficient personal computer skills as a problem when using CBT. This suggests that there is still a training need in this area and/or that CBT designers need to pay particular attention to the ease with which their packages can be navigated.

Contrary to our expectations we found that there was support for compulsory CBT amongst seafarers but this seemed to be coupled with a sense that companies should provide associated incentives for CBT completion. A range of incentives were described by seafarers as being likely to encourage them to undertake CBT on board and it is interesting to note that, whilst popular, financial incentives were not in the top three most frequently selected choices. This indicated that seafarers would prefer some 'carrots' along with the 'stick' of compulsion as a way forward in encouraging them to undertake CBT.

On the whole seafarers were willing to spend a remarkable amount of time on CBT with non-Filipinos being willing to spend similar amounts of working and free time

on CBT. Filipinos by contrast were keen to spend more working time on CBT than they were prepared to spend free time, indicating a recognition that CBT constituted work as opposed to recreation.

This last point is an important one. Seafarers did identify problems of time in making use of CBT and the results of our analysis suggested that fatigue could be associated with CBT use. In providing CBT on board it is important that ship operators do not regard this as an adequate substitute for the provision of leisure or recreational facilities/time. Learning is demanding and can be tiring (27% of the sample agreed that CBT was tiring and 28% found it stressful) and whilst there is much truth in the saying 'all work and no play makes Jack a dull boy' it is also important to remember that leisure is a necessity for the preservation of good mental health rather than a luxury that can be dispensed with. 'Dull boys', it is fair to say, rarely make good, safe, seafarers.

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