

An Empirical Study on Motivation and Performance of Maritime Trainees and its Implication for Maritime Education and Training

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Abstract : Accidents and incidents caused by poor performance in the maritime industry suggest the need to find ways to improve performance in order to operate effectively and improve safety. The data for this study was collected from maritime students and involves the performance and levels of intrinsic and extrinsic motivation. Various motivational factors were identified and the ways in which these factors relate to performance was analyzed. The importance of considering motivation when recruiting new trainees and workers, and continually looking for ways to increase intrinsic motivation, is stressed throughout this paper. The results suggest that high levels of good quality motivation correlate positively with better performance.

Key words : Performance, Motivation, Intrinsic, Extrinsic, Maritime Education & Training

1. Introduction

The maritime industry demands high performance from operational staff. High performance results in fewer incidents and accidents and a safe working environment. However, we continue to see media reports where human life has been endangered or lost and where the environment has been damaged (Presutti 2013; Drew & Mouawad 2014). Although these problems are addressed in various ways by educators, management and government regulators, they have yet to be effectively tackled. If a ship's crew is expected to perform well then it is surely during their time at maritime education and training (MET) institutes that full attention needs to be given to developing the motivation needed for outstanding performance.

This paper discusses the relevance of considering motivation in order to improve performance. The present research explored factors that motivate trainees and showed evidence of a relationship between motivation and performance. These results can help educators and management to choose the right person for the job and also help educators to create an environment that allows trainees to improve and maintain motivation so they can perform well.

The following two research questions were used to

address these issues:

1. What factors motivate South Korean maritime trainees in their choice of vocation and are there any significant trends?
2. What relationship exists within the sample between motivation and performance and could this knowledge help improve the performance of future crew members?

This paper brings together findings from related works as well as from empirical quantitative data that was received from maritime trainees through an information gathering instrument. The training institution involved in the research was Mokpo National Maritime University, Republic of Korea.

2. Literature Review & Methodology

2.1 Literature Review

Research suggests a link between a person's performance and their level of motivation (Griffin, MacKewn, Moser, VanVuren 2013). High levels of motivation, especially intrinsic motivation, have been shown to positively relate to performance (Deci & Ryan 1985, 1991). Deci and Ryan

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define intrinsic motivation as originating from within the person and describe it as enjoyable, rewarding and challenging. Extrinsic motivation, in contrast, occurs when tasks are not freely chosen and people are coerced or pressured, maybe through social approval or guilt (Deci & Ryan 1985).

According to Mitroussi, Kyriaki and Notteboom (2015), motivation of seafarers is central to effective human resource management. Their research revealed that lack of motivation may result in apathetic work attitude, poor time-keeping and high absenteeism and obstinacy to change. Conversely, in their paper on motivation and satisfaction aboard ship, Helmreich, Wilhelm and Runge (1981), note the high potential payoff for selecting individuals and organizing the environment to maximize performance. Goldberg (2012) states that even if we provide the tools and means to learn, but ignore the motivation, then we are missing half of the requirements for success. Goldberg believes that by students not focusing on the critical reasons for gaining knowledge and proficiency other critical aspects such as professionalism, knowledge and competency are ignored.

Although there are studies examining the relationship between motivation and performance there is very little industry specific research, especially within the maritime field. Research done in schools found intrinsic motivation correlated positively with achievement and learning outcomes (Benware & Deci 1984; Gottfried 1981; Grolnick & Ryan 1987). Recent research has confirmed the findings of those earlier studies. Conti (2001) found that in college students, high intrinsic motivation was associated with having personally well-thought-out goals. Tierney, Farmer, and Graen (1999), also found that intrinsic motivation in employees was related to higher levels of creative performance. As early as 1947, Anderson theorized that pilots who fly because they love to do so will experience less stress and anxiety in high performance situations. MET educators may want to ask, "Do our maritime trainees have a love for the ocean and sailing?"

The UK Maritime and Coastguard Agency released a guide for leaders in the maritime industry to improve people management skills to ensure safe operations. One of the ten core safety leadership qualities is motivation. They note that lack of morale has been shown to have an adverse

impact on error and violation rates and is therefore worthy of consideration (MCA 2014).

2.2 Methodology

To obtain data related to motivation and performance a questionnaire survey¹⁾ was designed for the focus group. In order to address Research Question 1, trainees were asked about their performance. South Korean undergraduates have little or no experience outside of classroom learning so they reported their High School Graduating (HSG) rank, recent TOEIC²⁾ test results, university grade point average (GPA), and class attendance rates.

It was hypothesized that students with higher HSG rank had achieved this by diligent study and by maintaining high levels of motivation. Despite much empirical evidence against the use of the TOEIC and its various deleterious effects (Chapman 2003, 2005; Childs 1995; Cunningham 2002), students who achieve high scores nevertheless, show a certain aptitude for focusing on learning and commitment to achievement. Students were asked to report their GPA to analyze performance in their university courses. It is assumed that a student achieving a higher score would be consistently performing well. Retrieving student attendance records was difficult so it was deemed appropriate to use a self-evaluation method instead. Good attendance would generally demonstrate higher levels of motivation.

The questionnaire also contained an item comprised of eleven motivational factors that were designed to explore respondents' motivation for choosing a career in the maritime industry. Extrinsic factors included money, parental pressure, prestige, long holidays, and military exemption. Intrinsic factors included love of the ocean and ships, desire for high responsibility, freedom of being at sea, being part of a team, and attraction of onboard career.

A summated rating scale of the eleven motivational items was then used in correlation analyses with the measures of performance data to answer Research Question 2. These motivational factors included one item specifically linked to maritime male students regarding exemption from standard military service. In South Korea, military service is compulsory for all young males except under special circumstances. Mokpo Maritime University cadets receive exemption with the understanding they will work a three year contract with the country's merchant shipping after

1) For a copy of the questionnaire please contact the author.

2) TOEIC - The test of English for international communication is a popular multiple-choice test in South Korea and Japan administered by the US-based Educational Testing Service and often used for university graduation and job placements.

graduation. It was therefore considered an important extrinsic motivational factor for this particular group.

The total number of participants was 253 with ages ranging from 19 to 27 ($M = 21.20$, $SD = 1.384$). Two hundred and seventeen (85.5%) of the participants were male and thirty-six (14.2%) were female. The participants were sampled from three university grades: freshmen ($N = 103$, 40.7%), sophomore ($N = 65$, 25.7%) and junior ($N = 85$, 33.6%). The age and gender variables were non-normally distributed due to various circumstances: therefore, data were initially tested non-parametrically. The survey was administered throughout April 2014 to respondents and data was subsequently analyzed using statistical software package SPSS ver. 21.

3. Empirical Results

The following results came from analyzing the performance data of respondents and pertain to research question one:

A total of 253 maritime students, ranging from first to third grade, reported their HSG rank (see Table 1). There was a 100% response rate for this item. HSG ranking ranges from 1 to 9 where 1 is the highest and 9 is the lowest. The majority of students graduated high school in the 2nd or 3rd rank, 44.7% and 30% respectively. Most of the students recruited by the maritime university demonstrated good performance in their high schools.

A total of 215 students, ranging from grades 1 to 3 answered the item about their most recent TOEIC score (see Table 1). There were 38 (15%) missing cases in the data set. TOEIC scores range from 10 to 990. In order not to require exact scores from respondents, the item gave 5 possible choices: 1 = less than 400, 2 = 400 - 495, 3 = 500 - 595, 4 = 600 - 695, 5 = 700+. Students who reported a score of 700+ was 33.2%. Only 2% had scores less than 400 points and the remaining respondents were evenly spread between 400 and 700 points. As a measure of central tendency the mean for the total respondents was 3.80 and the median was 4.0. This suggests that the average TOEIC score for the sample was around 600 points.

A total of 151 students reported their GPA for their first year at university (see Table 1). A GPA score is an averaged total taken from all courses where a 1 would be the lowest and 4.5 would be highest. 20.6% of respondents reported a GPA score between 3.1 and 3.5. Respondents receiving a score between 3.6 and 4.0 were 22.9%. These

Table 1 Descriptive Statistics for performance

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>S. D</i>
HSGRank	253	3	9	7.28	1.137
Toeic	215	1	5	3.80	1.185
GPA	151	1	7	5.42	.989
Attendance	253	2	5	4.65	.682
Valid N	141				

data include the majority of students and suggest that nearly a quarter surveyed had a higher than average score. Entry into a London university for example requires a GPA of 3.2 for applicants from South Korea (Feng 2016).

Students were asked to self-evaluate their attendance at classes taught at university. These results are naturally subjective. Students may have improved in attendance over a period of time or may not have reported accurately. The range of scores on this Likert-type item was from 1 - 5, where one represented 'very bad' to five representing 'very good'. A large number of students reported that their attendance was 'very good'. In order to make this variable more robust in future it would be necessary to attain official attendance data. A total of 253 students reported their opinion about their class attendance (see Table 1). None of the students reported having 'very bad' attendance. 75% of respondents said their attendance was 'very good' and 16% answered their attendance was 'good'.

Performance data was analyzed to see if there were any significant correlations between the four performance variables (see Table 2). They were tested non-parametrically using Spearman's rank correlation coefficient to see how closely the sets of performance rankings agreed with each other.

Table 2 Performance correlations

	<i>HSG Rank</i>	<i>Toeic Score</i>	<i>GPA</i>	<i>Attendance</i>
HSG Rank	1.000			
ToeicScore	.140*	1.000		
GPA	.097	.304**	1.000	
Attendance	.014	.041	.464**	1.000

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Based on the results of the study, according to Spearman's rho, there was a weak significant correlation between HSG rank and TOEIC score. Students that reported higher HSG Rank tend to rank higher in TOEIC score than lower HSG ranked students $r_s = .140$, $p < .05$.

High school tests and the TOEIC focus on memorization of facts and test formats are similar using multiple-choice questions. Students who perform well on one would also likely perform well on the other.

Based on the results of the study, according to Spearman’s rho, there was a moderate significant correlation between TOEIC score and GPA. Students that ranked higher TOEIC scores tend to also rank higher in their GPA than those reporting lower TOEIC scores $r_s = .340, p < .01$. Students likely see both of these performance indicators as important to their success.

A third correlation was seen between GPA and attendance variables. Students who reported higher GPA positively correlated with better attendance than those that reported lower GPA. Spearman’s rho coefficient for this correlation was $r_s = .464, p < .01$. Attendance is mostly compulsory and contributes to GPA. This correlation was expected but still demonstrates that these four variables are valid indicators of student performance.

Our second research question asked what kind of relationship exists between motivation and performance and how this could indirectly improve safety onboard. The null hypothesis for this question was that a relationship does not exist between motivation and performance. In order to answer the research question the performance and motivation variables were analyzed. Since the performance variables TOEIC and GPA had significantly lower sample sizes, they were analyzed separately from the other two performance variables. The eleven motivation variables were summated into a subscale called ‘motivation total’ (mot_tot). This was then divided into two further subscales for intrinsic motivation (mot_in) and extrinsic motivation (mot_ex). These two multi-item scales were then tested for internal consistency reliability using Cronbach’s alpha. The intrinsic motivation subscale appeared to have an acceptable internal consistency, $\alpha = .70$. The extrinsic motivation subscale only achieved poor internal consistency, $\alpha = .50$. This would need to be addressed in future studies.

The performance variables were initially presumed by the researcher to be a good indication of general motivation levels as they all involved making effort and investing time. However, as shown in Table 3, the Pearson’s correlation between total motivation scores ($M = 37.53, SD = 5.70$) and average TOEIC score ($M = 3.80, SD = 1.09$) failed to reject the null hypothesis that there is no relationship between motivation and performance, $r(251) = -.01, p > .05$. In fact, the result showed a slight negative correlation although not

significant. As motivation increased students reported lower TOEIC scores. Possible reasons for this may include the fact that the TOEIC test has little relevance to the maritime industry, except as a graduating and recruiting tool. Students may only be extrinsically motivated to achieve a test score. MET educators are encouraged to re-think the value of this test and monitor more closely the possible negative effects it may be having on motivation.

HSG rank similarly produced weak negative correlations with the motivation subscale. Two hundred and fifty three maritime students were surveyed about their combined intrinsic and extrinsic motivation ($M = 37.53, SD = 5.70$) and average HSG rank ($M = 7.28, SD = 1.14$). A Pearson’s r data analysis revealed a slight negative correlation, $r(248) = -.15$. This data was significant at the .05 level. Respondents who had higher levels of motivation reported lower HSG rank. This finding was unexpected. Since the motivation scores were based on a student’s motivation for choosing their major it is possible these data have little relationship. Therefore, using HSG rank as a basis for trainee entrance may not be a guarantee of good performance if high levels of intrinsic motivation for their studies is lacking.

Significant correlations were discovered between motivation and the two other performance indicators. A total of one hundred and forty nine maritime students were surveyed about their combined intrinsic and extrinsic motivation ($M = 36.99, SD = 6.10$) and GPA during their first year of university ($M = 5.41, SD = .99$). A Pearson’s r data analysis revealed a moderate positive correlation, $r(147) = .356$. This data was significant at the .01 level. Students who had higher motivation scores reported higher GPA scores as shown in Table 3.

Table 3 Motivation & performance inter-correlations and statistics

	Mot_Tot	Ex_Mot	In_Mot	Mean	SD
Mot_Total	1.000			37.53	5.70
Extr_Mot	.85**	1.000		19.19	3.00
Int_Mot	.89**	.51**	1.000	18.34	3.55
HSG rank	-.15*	-.09	-.17*	7.28	1.14
Attendance	.29**	.26**	.25**	4.65	.68
TOEIC	-.01	.02	-.02	3.80	1.09
GPA	.36**	.29**	.34**	5.41	.99

Note: * = sig. at the .05 level; ** = sig. at the .01 level

A total of two hundred and fifty-two maritime students were surveyed about their combined intrinsic and extrinsic motivation ($M = 37.53$, $SD = 5.70$) and average class attendance ($M = 4.65$, $SD = .68$). A Pearson's r data analysis revealed a moderate positive correlation, $r(250) = .293$. This data was significant at the .01 level. Students who had higher motivation scores reported better class attendance as shown in Table 3.

Both results indicate a possible link between higher levels of motivation and better performance. Although these results need to be verified and made more robust in future research, it can be hypothesized that improving motivation, especially intrinsic motivation, may well be worth the time and effort. Since GPA scores and attendance are highly relevant to the success of a student's career plan, it seems natural that intrinsically motivated students would have higher scores. These students may be more self-directed and dedicated than others, and it is these types of people that perform consistently well.

4. Conclusions

occupations, violations continue to occur often with tragic results. This paper has suggested that by considering motivation during MET the performance of future crew personnel can be enhanced. This research explored various motivating factors: some extrinsic and others intrinsic. Higher intrinsic motivation was found to correlate with better performance than extrinsic motivation. This supports other independent research.

After examining the relationship between motivation and performance within the sample, it appears that by improving motivation, especially intrinsic, students will perform better during training, especially if it is seen to be relevant to attaining personal goals. In the case of the TOEIC test it seems that students have extrinsic motivation to attain a good score but because it may be viewed as having little or no relationship to their career and future it had no significant correlation with career motivation.

In order for MET centres to continually improve and provide the shipping industry with highly motivated and qualified personnel, MET systems need to be regularly re-evaluated as to whether they actually nurture highly motivated students or perhaps decrease motivation. The balance between intrinsic and extrinsic motivation needs to be understood with the emphasis on encouraging intrinsic

over extrinsic motivation. This can be achieved in a variety of ways such as satisfying the needs of each individual regarding personal autonomy, a sense of competence and the need for relatedness. The authors believe this will result in long-term sustainable training.

In order to improve on the limitations of this paper future research needs to be carried out on a wider group of respondents that include ship crew. Comparing their motivation and performance in a real work environment would be very valuable. Also, a longitudinal approach to see how personnel motivation changes over time due to various factors and how these affect performance would also be beneficial for MET instructors and companies.

To develop the best onboard personnel and maintain high standards of safety, the authors believe motivation should be considered an important aspect of training. This will ensure a constant supply of highly motivated workers who will consistently perform at their very best. Trainees and crew that have high levels of intrinsic motivation are more likely to excel in their chosen careers. They will be the heroes that fulfill their obligations and improve the image of the maritime industry whatever the circumstances or trials they experience.

References

- [1] Anderson, R. C.(1947), "The motivations of the flyer and his reactions to the stresses of flight", *Journal of Aviation Medicine*, Vol. 18, pp. 18 - 30.
- [2] Benware, C., Deci, E. L.(1984) "Quality of learning with an active versus passive motivational set", *American Educational Research Journal*, Vol. 21, pp. 755 - 765. Cited by Recascino CM, Hall S (2003) *International Journal of Aviation Psychology*.
- [3] Chapman, M (2003), "The role of the TOEIC in a major Japanese company". Retrieved November 2011 from <https://jalt.org/pansig/2003/HTML/Chapman.htm>
- [4] Chapman, M (2005), "An over-reliance on discrete item testing in the Japanese business context". Retrieved November 2011 from http://flccu.ccu.edu.tw/conference/2005conference_2/download/C07.pdf.
- [5] Childs, M. (1995), "Good and bad uses of TOEIC by Japanese companies". In Brown and Yamashita (eds.) *Language Testing in Japan*. Tokyo, Japan: The Japan Association for Language Teaching, pp. 66-75.
- [6] Cunningham, C.(2002), "The TOEIC test and communicative competence". Retrieved from

- <http://www.cels.bham.ac.uk/resources/essays/Cunndiss.pdf>
- [7] Cohen, J.(1992), "A power primer", *Psychological Bulletin*, 112, pp. 115-159.
- [8] Cohen, J.(1988), "Statistical power analysis for the behavioral sciences" (2nd ed.) Hillsdale N. J.: Lawrence Erlbaum.
- [9] Deci, E. L., Ryan, R. M.(1985), "Intrinsic motivation and self-determination in human behavior", New York: Plenum.
- [10] Deci, E. L., Ryan, R. M.(1991), "A motivational approach to self: Integration in personality", *Nebraska symposium on motivation 1990: Perspectives on motivation*, pp. 237 - 288.
- [11] Drew C, Mouawad J (2014), "Breaking proud tradition, captains flee and let others go down with ship", http://www.nytimes.com/2014/04/20/world/asia/in-sad-twist-on-proud-tradition-captains-let-others-go-down-with-ship.html?_r=0. Accessed 15 May 2014
- [12] Feng, R.(2016), "Information for students from South Korea", retrieved from <http://www.qmul.ac.uk/international/international-students/countries/southkorea/>
- [13] Golderg, M.(2012), "Trainee motivation as a tool to improve maritime training outcomes", <http://www.maritimeprofessional.com/Blogs/Maritime-Training-Issues/May-2012/Trainee-Motivation-as-a-Tool-To-Improve-Maritime-T.aspx>. Accessed 17 May 2014
- [14] Gottfried, A. E.(1981), "Measuring children's academic intrinsic motivation: A psychometric Approach", Paper presented at the annual meeting of the American Psychological Association, Los Angeles. Cited by Recascino, C. M., Hall, S.(2003) *International Journal of Aviation Psychology*.
- [15] Griffin, R., MacKewn, A., Moser, E., VanVuren, K. W.(2013), "Learning skills & motivation: correlate to superior academic performance", *Business Education & Accreditation*, Vol. 5, No. 1.
- [16] Grolnick, W. S, Ryan, R. M.(1987), "Autonomy in children's learning: An experimental and individual difference investigation". *Journal of Personality and Social Psychology*, Vol. 52, pp. 890 - 898. Cited by Recascino, C. M., Hall, S.(2003), *International Journal of Aviation Psychology*.
- [17] Helmreich, R. L., Wilhelm, J. A. and Runge, T. E.(1981), "Motivation, Organization and Satisfaction Aboard Ship", The University of Texas at Austin Presented at The Seventh Annual Maritime Industry Symposium California Maritime Academy May 19, 1981.
- [18] Maritime and Coastguard Agency(2014), http://www.dft.gov.uk/mca/leading_for_safety-9.pdf. Accessed 7 May 2014
- [19] Mitroussi, K. and Notteboom, T.(2014), "Getting the work done: motivation needs and processes for seafarers and dock workers", *WMU Journal of Maritime Affairs* , pp. 1-19.
- [20] Presutti, C.(2013), "Aviation Experts Question Whether Culture Had Role in Asiana Crash", <http://www.voanews.com/content/aviation-experts-question-whether-culture-had-role-in-asiana-crash/1730757.html>. Accessed 20 May 2014
- [21] Roberts, G. C.(1992), "Motivation in sport and exercise: Conceptual constraints and convergence", In GC Roberts (Ed.), Champaign, IL: Human Kinetics.
- [22] Tierney, P., Farmer, S., Graen, G.(1999), "An examination of leadership and employee creativity", *Personnel Psychology*, Vol. 52, pp. 591 - 620. Cited by Recascino, C. M., Hall, S.(2003) *International Journal of Aviation Psychology*.
- [23] Yates, D., Moore, D., McCabe, G.(1999), "The Practice of Statistics", (1st Ed.). New York: WH Freeman.

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