



**COME SIT WITH US: EFFECT OF RECREATIONAL ZONES'  
INTERIOR DESIGN ON SEAFARERS' WELL-BEING IN FISHING  
VESSELS**

A Master's Thesis

by

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The Department of

Interior Architecture and Environmental Design

İhsan Doğramacı Bilkent University

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**COME SIT WITH US: EFFECT OF RECREATIONAL ZONES'  
INTERIOR DESIGN ON SEAFARERS' WELL-BEING IN FISHING  
VESSELS**

The Graduate School of Economics and Social Sciences  
of  
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by

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THE DEPARTMENT OF

INTERIOR ARCHITECTURE AND ENVIRONMENTAL DESIGN

İHSAN DOĐRAMACI BİLKENT UNIVERSITY ANKARA

August 2021

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## **ABSTRACT**

### **COME SIT WITH US: EFFECT OF RECREATIONAL ZONES' INTERIOR DESIGN ON SEAFARERS' WELL-BEING IN FISHING VESSELS**

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The aim of this study is to explore the factors in interior design of recreational areas and their effects on seafarers in Norwegian fishing vessels. The relationship between interior design of communal dining and living arrangements, well-being of seafarers and fatigue at sea have been researched. The methods of research are questionnaires of 34 crewmembers and interviews with 10 seafarers currently working onboard vessels or shipbuilding industry professionals with seafaring experience. The study consists of evaluations of 4 different fishing vessels' with 3 different takes on recreational zones as well as measuring well-being and fatigue. The study focuses on the personal experiences and evaluations of seafaring professionals. Findings propose that there is a positive relationship between general evaluation of recreational zones and well-being. Findings also help define which interior design characteristics of recreational zones are more satisfactory for seafarers in Norwegian fishing vessels.

Keywords: Fatigue, Recreational Zones, Seafarers' Well-being, Ship Interior Design

## ÖZET

### GEL VE BİZİMLE OTUR: BALIKÇI GEMİLERİNDE REKREASYONEL ALANLARIN İÇ MEKAN TASARIMININ DENİZCİLERİN İYİ-OLUŞU ÜZERİNDEKİ ETKİSİ

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Çalışmanın amacı, Norveç balıkçı gemilerinin rekreasyonel alanlarının iç mekan tasarım faktörlerinin denizciler üzerindeki etkisini araştırmaya yöneliktir. Denizde ortak yemek ve rekreasyonel alanların iç mekan tasarım öğeleri, iyi oluş hali ve yorgunluk arasındaki ilişki araştırılmıştır. Araştırmanın metodu 34 denizci ile yapılan anket ve 10 denizciyle yapılan röportajlar şeklindedir. Çalışma 3 farklı iç mekan tasarımına sahip 4 gemi hakkında yapılmış olup, rekreasyonel alanların genel değerlendirmesi yanı sıra iyi oluş hali ve yorgunluk da ölçmüştür. Araştırma denizcilerin kişisel tecrübeleri ve değerlendirmelerine dayanmaktadır. Sonuçlar, rekreasyonel alanların genel değerlendirmesi ve iyi oluş hali arasında pozitif bir ilişki olduğunu göstermektedir. İç mekan karakteristiklerinin hangilerinin Norveç balıkçı gemilerinde daha tatminkar olduğuna ışık tutmaktadır.

Anahtar kelimeler: Denizci İyi Oluş Hali, Gemi İç Mekan Tasarımı, Rekreasyonel Alanlar, Yorgunluk

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I would like to finish with the ending of a poem, that has kept me thinking ever since I heard it:

“  
...”

*Ney! Fisken i Vandet, det er vores Brød,*

*Og miste vi hannem, da lide vi Nød,*

*Og jammerlig nødes at sukke. “*

Dass & Dass, 1849, p.57

*“The fish in the water, our livelihood is;*

*If he stays away, then our lives are amiss;*

*We sigh in distress and terror.”*

(Vistdal, 2015, p.150)



## TABLE OF CONTENTS

ABSTRACT .....	iii
ÖZET .....	iv
ACKNOWLEDGEMENTS .....	v
TABLE OF CONTENTS .....	vii
LIST OF TABLES .....	xi
LIST OF FIGURES .....	xiii
LIST OF ABBREVIATIONS .....	xvi
CHAPTER 1: INTRODUCTION .....	1
1.1 Aim of the Study .....	4
1.2. Structure of the Thesis .....	5
CHAPTER 2: LIFE ON MARITIME ENVIRONMENTS .....	7
2.1. Habitability Standards in Maritime Environments .....	9
2.2. Human Factors in Maritime Environments .....	12
2.3. Maritime Environments as Extreme and Isolated Environments .....	13
CHAPTER 3: WELL-BEING IN SEAFARING .....	15
3.1. Well-Being in Seafaring Populations .....	15

3.1.1. Stress in Seafaring Populations .....	18
3.1.2. Fatigue in Seafaring Populations .....	19
3.2. Well-Being and Environment .....	20
3.3. Characteristics of Environments that Support Well-Being .....	23
3.4. Examples of Recreational Zones in Ships .....	26
CHAPTER 4: METHODOLOGY .....	38
4.1. Research Questions .....	39
4.2. Participants & Settings .....	41
4.3. Method of the Study - Stage 1 .....	51
4.3.1. Instruments and Procedure of the Study .....	51
4.3.3. Pilot Study .....	59
4.4. Method of the Study - Stage 2 .....	60
4.4.1. Instruments and Procedure of the Study .....	60
4.4.2. Interviews .....	61
CHAPTER 5: RESULTS .....	63
5.1. Data Analysis .....	63
5.2. Results of Stage 1 .....	63
5.2.1 Quantitative Analysis .....	63
5.2.1.1. Descriptive Analysis .....	63

5.2.1.2. Inferential Analysis .....	71
5.2.2. Qualitative Analysis .....	74
5.3. Results of Stage 2 .....	76
5.3.1 Analysis Procedure of Interviews.....	76
5.3.1.1. Analysis of Interviews According to Functions and Activities.....	84
5.3.1.2. Analysis of Interviews According to Interior Design Characteristics.....	86
5.3.1.2.1. Analysis of Interviews According to Layout .....	86
5.3.1.2.2. Analysis of Interviews According to Sociopetal/ Sociofugal Qualities .....	87
5.3.1.2.3. Analysis of Interviews According to Indoor Environmental Factors.....	88
5.3.1.3. Analysis of Interviews According to Demographics & Daily Routines.....	89
5.3.1.4. Analysis of Interviews According to Expressions .....	90
5.3.2. Visual Summary of Findings.....	93
CHAPTER 6: DISCUSSION .....	99
CHAPTER 7: CONCLUSION.....	103
REFERENCES .....	107
APPENDICES .....	127
APPENDIX A. ETHICS COMMITTEE APPROVAL .....	128

APPENDIX B. QUESTIONNAIRE FORM FOR STAGE 1 (IN ENGLISH).....129

APPENDIX C. INTERVIEW FORM FOR STAGE 2 (IN ENGLISH).....144

APPENDIX D. STATISTICAL ANALYSES .....149

## LIST OF TABLES

1. Comparison of vessels .....	50
2. Layout Evaluation questions in author prepared survey .....	54
3. Pleasantness Evaluation questions in author prepared survey .....	55
4. Indoor Environmental Factors Evaluation questions in author prepared survey .....	56
5. Evaluation of amount of time spent question in author prepared survey .....	56
6. Restorativeness evaluation questions in author prepared survey .....	56
7. Summary of demographics.....	64
8. Summary of the amount of time spent in zones by seafarers .....	69
9. Mean ranks between vessels and their evaluations of subscales from the evaluation of recreational zones.....	72
10. Answers to improvement question .....	75
11. Emergent themes and detailed sub-themes .....	80
12. Summary of demographics .....	149
13. Summary of the amount of time spent in zones by seafarers .....	151
14. Mean ranks between vessels and their evaluations of subscales from the evaluation of recreational zones. ....	152
15. Non-Parametric Anova (Kruskall-Wallis) between vessels and their evaluations of subscales from the evaluation of recreational zones .....	153

16. Bivariate correlation between General well-being and General evaluation of recreational zones .....	154
17. Bivariate correlation between Physical well-being and General evaluation of recreational zones .....	155
18. Bivariate correlation between Social well-being and General evaluation of recreational zones .....	156
19. Bivariate correlation between Hedonic well-being and General evaluation of recreational zones .....	157

## LIST OF FIGURES

1. Partial plan of recreational zones of a trawler fishing vessel. ....	27
2. Partial plan of recreational zones of a longliner fishing vessel. ....	27
3. Joint messroom and dayroom of a Norwegian fishing vessel view from quiet lounge. ....	28
4. Joint messroom and dayroom of a Norwegian fishing vessel view from mess room. ....	29
5. Separated mess room and day room of a multi-purpose platform supply vessel. ....	29
6. Separated mess room and day room of a multi-purpose platform supply vessel. ....	30
7. Disco and bar on crew deck on Norwegian Breakaway passenger vessel. ....	31
8. Partial plan of recreational zones in trawler fishing vessel. ....	32
9. Serving areas of mess room .....	34
10. Tables and windows in mess room, partial view of day room with separating door. ....	34
11. Sofas, chairs, decorative wall and TV unit in dayroom. ....	35
12. View from aft windows, blocked by equipment and ship deck. ....	36
13. TV Unit in day room. ....	36

14. Partial plan of recreational zones of Vessel A. ....	43
15. Photograph from Vessel A - Mess Room tables and beverage serving area .....	44
16. Photograph from Vessel A - view into the Quiet Lounge, fireplace, recliners & massage chairs .....	44
17. Photograph from Vessel A, view to Lounge 1 & Lounge 2 with TVs.....	45
18. Partial plan of recreational zones of Vessels B&C. ....	45
19. Photograph from Vessels B&C, mess room tables and serving area .....	46
20. Photograph from Vessels B&C, view from Smoker’s Lounge, with TV and frosted glass windows into mess room.....	46
21. Photograph from Vessels B&C, view into Day Room with sectional sofa, artwork on wall and decorative motif on floor. ....	47
22. Partial plan of recreational zones of Vessel D. ....	47
23. Photograph from Vessel D, view into day rooms, foreground recliners, background fireplace, TV and sofas.....	48
24. Photograph from Vessel D, view into mess room, foreground service area, background round tables. ....	48
25. Photograph from Vessel D, view into Quiet Lounge, recliner chairs. ....	49
26. WeBS subscales according to questions, listed as Financial Well-being (FW), Physical Well-being (PW), Social Well-being (SW), Hedonic Well-being (HW) and Eudaimonic Well-being (EW).....	58
27. Summary of research design .....	62



28. Pie chart of participants according to vessel codes .....	66
29. Pie chart of participants according to nationality .....	66
30. Pie chart of participants according to genders .....	67
31. Pie chart of participants according to occupation .....	67
32. Pie chart of participants according to work experience .....	68
33. Bar chart of amount of time spent in working zones .....	70
34. Bar chart of amount of time spent in recreational zones.....	70
35. Bar chart of amount of time spent in cabins.....	71
36. Summary of Vessel A, positive and negative expressions on functions and interior design characteristics.....	94
37. Summary of Vessels B&C, positive and negative expressions on functions and interior design characteristics .....	95
38. Summary of Vessels D, positive and negative expressions on functions and interior design characteristics.....	96
39. Circular flow of a 12 hour period in a seafarer's day.....	97

## **LIST OF ABBREVIATIONS**

ABS	American Bureau of Shipping
ART	Attention Restoration Theory
HPL	High Pressure Laminate
HVAC	Heating, Ventilation and Air Conditioning
ILO	International Labour Organization
IMO	International Maritime Organization
PFS	Piper Fatigue Scale
POE	Post Occupancy Evaluation
PVC	Polyvinyl chloride
SOLAS	Safety of Life at Sea Convention
SWB	Subjective Well-being
WeBS	Well-being Scale

# CHAPTER 1

## INTRODUCTION

As an invisible workforce, seafarers live quite a different life than their peers on land (Kremakova, 2019). However, the days when seafaring was a prestigious profession was a long time ago, and the maritime industry is facing a shortage of skilled workforce, due to challenging conditions of life on sea (Magramo & Gellada, 2009). Even though interventions exist to make life better on sea, seafaring is still weighed down by various well-being related issues (Aikaterini et al., 2019)

Seafaring has long been considered one of the most difficult and dangerous occupations, with a high rate of accidents and unique situations that working on sea brings compared to land-based jobs (Baum-Talmor, 2020; Cheung et al., 2016). The consequences of these marine accidents could be severely catastrophic both to the marine environment and to human life (Akyüz & Çelik, 2018).

Prevention of marine accidents is important as apart from natural habitat, they can also disturb the economic activities of countries and even lead to social and cultural disruption (Kulkarni et al., 2020). Statistically almost 80% of these accidents are

related to human error, (Çelik & Er, 2007), and steps to improve the working environments' design are an important part of limiting the number of these incidents (Arslan & Er, 2007).

The past few decades has shown that in order to decrease the amount of marine accidents, a greater effort must be made to understand the seafarer as a human operator, the working environment and organizational structures (Endrina et al., 2019). Working environments and their design is thought to be important to prevent these accidents and provide safe conditions for seafarers to be working in vessels (Arslan & Er, 2007).

It has been proven that human error is not actually the cause of accidents but the starting point (Grech et al., 2019) and a multi disciplinary effort is necessary to understand the interplay between the human and non-human components to prevent accidents and losses (Dobie, 2000). It should be kept in mind that in a ship; organisational culture, number of crewmembers and working environment are related with each other (Nævestad, 2017). It could be said that ships are complex sociotechnical systems, which are sets of interrelated elements such as the physical environment, technology, individual and society and culture (Grech et al., 2019). As a complex sociotechnical system; technology, individual, organizational structure and external environment affect each other in a vessel (Sąlyga & Kušleikaitė, 2011). Working on sea is associated with mental, psychosocial and physical stressors (Carotenuto et al., 2012) and has demanding characteristics (IMO, 2019). There is a

complex relationship between the demands of seafaring and its effects (Pauksztat, 2017). Long and irregular work hours with an extended time away from home, leads to the ship becoming both a living space and a working space for seafarers, which causes blurred boundaries between rest and work, with the additional environmental stress factors such as extreme weather conditions and noise (IMO, 2019). The constant motion of the sea also affects seafarers negatively by motion induced sickness and decreasing cognitive and physical abilities (Bridger & Pisula, 2012).

Seafarers due to these extreme job demands have higher rates of accidents, hospitalization and mortality compared to peers of other occupations (Andruškiene et al., 2016). Laborers in fishing fleets face additional challenges such as high levels of stress and monotonous working conditions (Sandsund et al., 2019). As a result of these factors seafaring as an occupation is becoming less and less attractive in developed countries (Slišković & Penezic, 2015). Therefore research on how to minimize marine accidents, working environments on ships and human factor studies on working spaces on ships have been prevalent in this area of research (Nævestad, 2017). However, apart from the physical stress factors such as noise, heat, ventilation and sea motion, there is a lack of research on the interior design and environmental psychology of commercial, non-passenger vessels. Working, living and sleeping conditions of the seafarers has been shown as a future study prospect for researchers (Jepsen et al., 2015; Nævestad, 2017).

The Author's interest in this subject has started after working as an interior designer in the shipbuilding industry for 5 years. During this time, her professional and personal conversations with industry experts and crewmembers of vessels has led to conduct her research on how ship environments were affecting the seafarers and what could be improved for the better of crewmembers. Even though the author has worked on more than 14 different projects belonging to several different types of vessels, Norwegian fishing vessels were selected as they operate in some of the harshest weather conditions. Another important point was that the organizational structure on board fishing vessels is more complex than other vessels as the zones are usually different than a bulk carrier or a chemical tanker., including factories and more complex recreational zones with emphasis on interior design.

### **1.1 Aim of the Study**

Life of crewmembers on board is heavily influenced by their workload and the places they work and live in (Hystad & Eid, 2016). The aim of this study is to explore the relationship between the interior design characteristics in recreational zones of fishing vessels and the seafarers' well-being and fatigue levels. Despite numerous studies on seafarers' fatigue or interior design characteristics of different kinds of vessels (Allen et al., 2019; Hystad & Eid, 2016; Kılıç, 2020; Rumawas, 2016) there is a gap of research on how the interior design of the recreational zones affect seafarers' environmental psychology in fishing vessels.

Recreational zones in this study have been limited mainly to Mess Rooms and Dayrooms, which are the dining halls and lounges, as the main recreational zones in a ship that serve the nutritional, social and recreational needs of seafarers. By measuring the evaluations of seafarers' recreational environments on board vessels, well-being and fatigue levels an understanding of how interior design is effective on seafarer's well-being is targeted. Additionally, perceptions of seafarers regarding their experiences could give direction to a better understanding of how interior design features are received and how they can be improved. The present study researches Norway registered fishing vessels with mainly Norwegian participants without the mixed effects of flag and nationality as done previously on other research (Nævestad, 2017).

## **1.2. Structure of the Thesis**

The structure of the present thesis follows as such. The first three chapters consist of the literature review providing a framework for the research part. Chapter 1 is the introduction for the readers who might know little about seafaring and its occupational demands. Chapter 2 describes shipboard life for seafarers and the current standards that make up the accommodation facilities. Chapter 3 focuses on well-being in seafaring context.

Chapters following the literature review consist of the research questions, hypotheses and methodology of the study and the analysis of the collected data with discussion and future directions. Chapter 4 starts with the research questions and hypotheses and explains in detail the participant group, instruments used and the pilot study. Chapter 5 focuses on the analysis of these data and Chapter 6 discusses the findings and integrates the analysis and partial plans together in a holistic approach. Chapter 7 concludes with limitations and future possibilities for research.



## **CHAPTER 2**

### **LIFE ON MARITIME ENVIRONMENTS**

Maritime environment refers to shipping and ship related environments, although it is quite often used interchangeably with marine environment which refers to environments that are in the sea (Hildebrand & Schröder-Hinrichs, 2014). Life on board maritime environments is different and has unique characteristics than environments built on land (Bridger et al., 2010). The constant motion of water, limited spatial arrangements and social isolation contribute their challenges for the occupants (Riola & Garcia, 2020; Suedfeld, 2012) whether they are circumnavigating the World for pleasure or working on expedition boats in polar waters (Suedfeld, 2012) .

Ships according to their purpose can be grouped under several categories such as bulk carriers, container ships and passenger ships - of which cruise ships are an example of-, among others (Simons, 2013). For instance passenger vessels are designed to carry passengers and a ferryboat is a type of passenger vessel with a purpose of carrying transportation cargo (Ahola et al., 2018; van Dokkum, 2007). Similarly, fishing vessels are considered to be one of the distinctive types of ships and are grouped according to their fishing gear models such as trawlers and other types(van Dokkum, 2007) . Fishing is one of the most dangerous occupations,

relevant regulations in force by international agencies to improve safety on fishing vessels strive to promote safety on board these vessels (Burella et al., 2019).

Life in maritime environments has been the subject of some sociological discussions for a while and it has been suggested that for a meaningful statement on the social structures of a vessel, it is necessary to compare ships with similar environments; such as industrial production plants (Aubert & Arner, 1958). The uniqueness of ships when compared is that the work environment is the same environment that the seafarers live, rest and partake in leisure activities in, and in this way can be constituted as “Total Institutions” (Simons, 2013). Total institutions are characterized by being a place of residence in which residents with similar situations lead a formally managed life and are isolated from the society for a period of time (Davies, 1989). Ships and other seagoing vessels such as submarines fit into this description with their limited spatiality and physical and social isolation (Simons, 2013).

The fundamental accommodation zones within a ship are compartmentalized according to their functions as: operational areas such as wheelhouse, resting areas such as cabins, dining areas such as mess rooms, wet areas such as bathrooms and circulation zones such as corridors (Kılıç, 2020). Even though the facilities differ from vessel to vessel by type, size, layout and purpose (Simons, 2013), the essential zones for dining and socializing on vessels can be found under the names of Mess Rooms and Day Rooms (Prabowo et al., 2018). The design and placement of these mess rooms and recreational zones in ships might change according to regulations.

However they almost always have a serving area for food, a dining area for crew members to sit and lounges with different equipment for socialising and relaxing (Maritime Labour Convention, 2006). Day rooms are spaces where crewmates can sit, relax and rest, whereas mess rooms are dining halls within a ship (Dayroom, n.d.; Messroom, n.d.).

## **2.1. Habitability Standards in Maritime Environments**

Habitability in general is described as the suitability of an environment for human living and use, in maritime context habitability refers to factors which cumulatively build the habitat in which the ships crews are living and working in regularly (Matsangas & Shattuck, 2021) and includes proper accommodation to sleep and rest, facilities to store and prepare food and to dine, sanitary facilities and recreational facilities to relax and to socialize (Rumawas, 2016).

Even though shipping has a long history, areas where the crew slept, dined and lived in has been the focus for only several decades (Matsangas & Shattuck, 2021; Wilcove & Schwerin, 2008). As with most cases, the regulations were mostly focused on safety of the goods carried rather than safety of crew (Hormann, 2006). Mid 18th century flagged the beginning of a registration for ships, regarding their seaworthiness which led to the founding of first classification societies and their respective classification standards in 1834 in Britain (Walters & Bailey, 2013). These recognized organizations were mainly concerned with the safety of cargo and the

vessel at the start, beginning to only be concerned about the lives of the seafarers onboard at later stages and their main function was to ensure that a ship is seaworthy enough to go on a voyage (Hormann, 2006). However the study of factors affecting satisfaction with shipboard life lacks serious exploration, with most of the research on shipboard habitability being conducted more than 20 years ago (Wilcove & Schwerin, 2008).

As the process for internationalized standards followed the tragedy of the Titanic in 1912, with the loss of 1501 lives on sea (Walters & Bailey, 2013). The International Convention for the Safety of Life at Sea or more commonly known as SOLAS was hosted by the United Kingdom government afterwards, and was related to construction of vessels and life saving appliances and technical specifications (Størkersen et al., 2017, Walters & Bailey, 2013).

The 1987 catastrophe of the Herald of Free Enterprise, and Estonia in 1994 which were mainly caused by managerial errors led International Maritime Organization (IMO) to prepare a code to regulate workplace safety and pollution and began to view human and organizational factors from a different perspective (Schröder-Hinrichs et al., 2013, Størkersen et al., 2017). However after the second half of the 20th century, deviations from previous regulations led to global competition and allowed shipowners to choose for easier and cheaper regulatory establishments, which weakened seafarers' rights on working conditions (Størkersen et al., 2017). Even though the rules and regulations are suggested to be followed internationally, flag states have different takes on them; for instance, Danish flag rules do not apply to other flags, and studies should be evaluated according to the conditions of each

flag (Borch et al., 2020) and Korean flagged fishing vessels partially meet accommodation standards of ILO, 2007, however fail to meet some such as noise, ventilation and leisure facilities (Kim & Park, 2010).

Aim of the Marine Laborers Convention (MLC, 2006) is to create a single, coherent instrument setting out the minimum international standard, drawing together more than 65 international labor standards related to seafarers adopted over the last 80 years (Barnett & Pekcan, 2017). The subjects of the standards include physical arrangements, spatial characteristics, and ambient environmental qualities of vibration, noise, indoor climate, and lighting (Neelakantan et al., 2017). International Maritime Organization's (IMO) general standards for safety and security is followed through in the design process of ships (Ahola et al., 2018).

If the ABS Habitability standards, along with other habitability standards are examined, it can be seen that sleeping quarters are explained in a very detailed way (ABS, 2016; IMO, 2019), however recreational and catering facilities are often not so detailed, usually only described with physical stress factors and the equipment which should be present. Lützhöft et al. (2017) discusses whether or not the current regulations and relevant rules answer the psychological and operational requirements of the end-users. Recreational facilities both in vessels and on shore influence well-being positively by affecting well-being, satisfaction with life and motivates crew of vessels hence increasing motivation, performance and safety at sea (Gökçek & Tavacıoğlu, 2018), therefore recreational facilities and the standards for this facilities

could be a potential exploration and research area, as they are effective of well-being on sea.

## **2.2. Human Factors in Maritime Environments**

Human element is considered the main element in marine incidents, with a very high rate of (75% - 96%) role in accidents and with negative effects on health, property and environment (Galieriková, 2019; Gökçek & Tavacıoğlu, 2018). Human factors in the maritime industry emerged as a way of preventing accidents and losses on sea during the 1910s and started to look into crew performance in the 1960s (Grech et al., 2019). However, it is not very possible to overcome human errors induced by poor design of the workplace with more training, manuals or written procedures (Rumawas, 2016). Moreover human factor studies in maritime environments are mostly reduced to partial zones and their ergonomics, such as the efficient design of the navigational office of a ship; the bridge (Endrina et al., 2019), although both, navigation and accommodation places should be designed taking into account ergonomic aspects (Arslan & Er, 2007).

As human-centered and habitability-centered ship designing reduces the risk of failing usability tests with end-users (Lützhöft et al., 2017), incorporating human factors, and ergonomics right from the start of the ship-building process is highly desirable (Neelakantan et al., 2017) and an integrative endeavor to understand

human factors is necessary (Dobie, 2000). Very often crews' opinions on design and construction is not regarded, and the specialized body of knowledge of shipboard life and operations are often skipped during design development of ships (Ahola et al., 2018).

Ergonomic comfort perceptions on accommodation areas used for rest of seafarers differ with personal conditions and priorities (Kolcubaşı & Erginer, 2020). Noise, vibration and motion can be considered another major focus area within the human factor studies as well; developed frameworks upon the international regulations on noise, vibration and motion on board link human reliability to these factors (Endrina et al., 2019) and seafarers might not be educated well enough about comfort criteria constituted by classification societies (Kolcubaşı & Erginer, 2020). It is important to note that noise and vibration measurements differ during port-stay, sea voyage and river voyage but temperature is almost always constant (Oldenburg et al., 2020). Noise levels on different types of fishing vessels have been the subject of previous research before and possible interventions have been suggested (Burella et al., 2019).

### **2.3. Maritime Environments as Extreme and Isolated Environments**

Isolated and confined environments can be particularly challenging for the employees working in such situations, and while not as extreme as Antarctic stations or space stations, ships can be considered as isolated and confined environments due to limited spatiality (Hystad & Eid, 2016, Suedfeld, 2012). The characteristics of

extreme and isolated environments are that they are dangerous to human survival and well-being, they can be in recreational, occupational or traumatic contexts, and that they are remote from an individual's customary psychosocial environment (Suedfeld, 2012).

Psychosocial aspects of living and working in isolated environments identify the need for privacy and the adverse effects of crowding as significant issues (McCartan et al., 2014) similar to Antarctic stations which are extreme environments situated in an isolated setting (Suedfeld, 2012). Little options for recreational activities also make life for the occupants of these extreme and unusual environments for occupational purposes harder than customary examples (Temp et al., 2020). In seafaring context this is significant as a previous study has shown that individuals prone to boredom suffer from lapses in attention and might not be suitable for seafaring or for working in extreme and isolated environments for longer periods of time (Jegaden et al., 2019; Suedfeld, 2012).



## **CHAPTER 3**

### **WELL-BEING IN SEAFARING**

#### **3.1. Well-Being in Seafaring Populations**

Well-being is an elusive term to universally define (Eger & Maridal, 2015). While it has been defined as happiness by some, prosperity and quality of life has also been the focus of well-being too (Eger & Maridal, 2015). Literature divides well-being into two aspects as hedonic and eudaimonic (Dodge et al., 2012). Hedonic well-being is mainly concerned with the optimal psychological experience and functioning of an individual (Phillips et al., 2005) whereas eudaimonic well-being is described as a state in which the individual is able develop their potential, work efficiency, and build positive and robust relationships (Pontin et al., 2013). Organizational well-being research focuses on both conceptualizations of hedonic and eudaimonic well-being (Sonnentag, 2015). Hedonic well-being has been accentuated most in organizational research (Bartels et al., 2019), and affective well-being research has been utilized to predict the points which may result in undesirable states for the employees, such as burnout (Sonnentag, 2015).

Well-being of crewmembers is closely related to physical and psychosocial demands of seafaring (Jeżewska et al., 2020). As ships are total institutions which include aspects of seafarers' living and working environments (Simons, 2013), it can be said that well-being in seafarers should be examined under three environmental perspectives, residential environment and well-being, social environment and well-being and working environment and well-being. However for seafarers the social isolation that comes with working onboard a limited space might be negatively affecting the subjective well-being and satisfaction with life (Gökçek & Tavacıoğlu, 2018). Apart from environmental stressors, separation from family, loneliness, fatigue, multi-nationality and limited recreation activities are the most important factors affecting well-being in seafaring context (Carotenuto et al., 2012; McVeigh et al., 2017).

Well-being in seafaring is a very critical subject as the performance of the crewmembers on board or their mental health can be critical in certain circumstances (Iversen, 2012). A harsh physical environment, rapid changes in work and rest schedules, high levels of stress and monotonous work have adverse effects on the general well-being of seafarers (Divari, 2020; Sandsund et al., 2019). A moving environment may also result in decreased performance for a variety of reasons: motion induced sickness, negatively impacted motivation and biomechanical effects (McCauley et al., 2007). Due to the global shortage of seafarers and the ability to retain crewmembers is forcing governments to address the physical conditions on board and the working conditions of seafarers (Yuen et al., 2018). Benefits from improved retention of seafarers and avoidance of accidents are greater and important

than the financial costs that may arise (Slišković & Penezic, 2015). Some of the important reasons for early reassigning of seafarers could be the disorders related to seafaring, psycho emotional stress and fatigue (Šalyga & Kušleikaitė, 2011). Therefore well-being studies and factors affecting well-being in ships is an important yet a newly emerging subject (Nielsen et al., 2013).

Crewmembers' well-being is closely related to physical and psychosocial demands of seafaring (Jeżewska et al., 2020) and it can be classified as mental and physical well-being (Bal Beşikçi et al., 2015). Mental well-being refers to an individual's ability to advance their potential, work efficiently and build strong and positive social relationships, which is focused on eudaimonic well-being (DeCates et al., 2015; Pontin et al., 2013) whereas physical well-being or physical health refers to optimal bodily function (Cella, 1994) and lack of illness and disease (Cross et al., 2018).

There is a complex relationship between the demands of seafaring and its effects; motivation and coping mechanisms play a role as well as fatigue and should be taken into consideration (Pauksztat, 2017). If the main motivators of seafarers are considered, then psychosocial factors are seen to be more important than organizational or structural factors (Slišković & Penezic, 2015). Psychosocial exposure especially could have a significant effect on the mental well-being of seafarers (Borch et al., 2020). The working environment greatly affects efficiency of laborers as well as fatigue and psychology (Zincirkıran Can, 2021) and evaluation of

life quality and health differs within profession groups in a ship as and could be related to the type of vessel and its functions, with navigational officers (captains, commanding groups) reporting highest on both physical and psychological quality of life scores and technical personnel (engineers, auxiliary personnel) reporting lowest (Juozulynas et al., 2007).

### 3.1.1. Stress in Seafaring Populations

Stress among seafarers could be described as having their roots in a triangle; perception and feeling, direct consequences and state of health (Iversen, 2012). Seafarers experience environmental chronic stressors that come with being in an isolated and confined environment such as social isolation, being away from their family and inability to leave their workplaces (Doyle et al., 2015). Seafarers experience stress related to specific working conditions, which may result in physical and mental health problems (McVeigh et al., 2017). Main psychological challenge that affects seafarers is loneliness and social isolation and “burn-out” syndrome (Juozulynas et al., 2007). As stress is one of the main factors influencing the quality of life of seafarers working in ships, specifically fishing vessels, interventions designated to lower stress should be implemented (Park & Hyun, 2016).

Stress in seafaring can be divided in the physical environmental conditions and task characteristics (Riola & Garcia, 2020). Environmental stressors include noise, thermal extremities, vibration of the vessel, isolation, occupational dangers which affect cognitive and physical performance negatively, whereas task conditions refer

to time pressure, sleep deprivation and fatigue (Dobie, 2000; Riola & Garcia, 2020). Crew members in a previous study have listed stressors affecting their comfort mostly in decreasing order as noise, vibration and heat (Oldenburg et al., 2020).

### 3.1.2. Fatigue in Seafaring Populations

Fatigue is defined by IMO as “a state of physical and/or mental impairment resulting from factors such as inadequate sleep, extended wakefulness, work/rest requirements out of sync with circadian rhythms and physical, mental or emotional exertion that can impair alertness and the ability to safely operate a ship or perform safety-related duties.” (2019, p.1). Fatigue as a subjective phenomena could be influential in affecting health independently from other occupational risk factors (Smith et al., 2006). Seafarers’ fatigue is a widespread problem that is a serious health and safety issue (Allen et al., 2019). Fatigue has been shown to be closely related to situation awareness failures (Barnett & Pekcan, 2017). There are several factors which contribute to fatigue at sea which can lead to negative health outcomes in the longer term (Iversen, 2012). There is a substantial amount of evidence pointing out that fatigue and prolonged wakefulness leads to lowered cognitive and well-being outcomes (Andrułkienė et al., 2016; Vyazovskiy, 2015).

Efforts to understand how to decrease fatigue in seafaring have been prevalent for many years (Arslan & Er, 2007). Some of the factors contributing to fatigue have been understood to be related to seafarers’ environmental conditions and their working duration as well as poor quality of sleep (Arslan & Er, 2007; Hystad & Eid, 2016). Increase in port turnover frequencies and restrictions placed on seafarers in

port areas have led to seafaring not leaving their vessels at all (Brenker et al., 2017). Therefore it can be said that the social life of a seafarer is actually very limited to the same people they work with (Brenker et al., 2017). Arslan & Er (2007) propose that social facilities at ports could be developed to decrease fatigue of seafarers, whereas Sonnentag (2011) proposes that detachment from stressors could have a lessening effect on fatigue. In the case that this physical and mental detachment process is neglected, fatigue can accumulate over time and might lead to health problems in the long term (Bridger et al., 2010).

### **3.2. Well-Being and Environment**

Environments have the power to affect the well-being of individuals and communities, through spiritual, mental, emotional, social and physical ways (Dearborn, 2017; Smith et al., 2012) and the relationship between different types of environments and their effects on well-being has been the subject of many studies (Briner, 2000, Garrett et al., 2019, Mouratidis, 2018, Zhang & Zhang, 2017). Therefore the foundation of well-being can be considered in design, leading to designing buildings that improve the health of their occupants (McCartan et al., 2014). Design sciences tend to use Subjective Well-being to enhance and research factors affecting occupants happiness and well-being in interior spaces (Petermans & Pohlmeier, 2014). Well-being and its relationship with work, has been an important topic within organizational researchers to better understand the effects of the work toll and adverse effects on employees as well as workplace efficiency (Bartels et al.,

2019; Bryson et al., 2017). As stated by McCartan et al., a well designed workplace can be a powerful tool to support employee performance (2014).

If we turn our gaze into residential environments and their effect on well-being; previous research has shown that residential satisfaction might mediate the effects of environmental stress factors on psychological well-being (Phillips et al., 2005) and residential satisfaction levels are also positively correlated with higher quality of life scores (Zhang & Zhang, 2017).

Another key environment that is effective in well-being is the social environment (Norstrand et al., 2012; Repetti, 1987). Yen & Syme (1999, p.288) define social environment as “ the groups to which we belong, the neighborhoods in which we live, the organization of our workplaces, and the policies we create to order our lives”. The physical environment and social environment are not independent of each other, and in residential contexts are related to neighborhood physical settings (Yen & Syme, 1999). In the context of workplaces, good social environments are helpful in achieving organizational transitions and support employee well-being (Daniels et al., 2017), and it has been found that social environment is able to influence individuals’ well-being by presenting favorable circumstances, implementing control and decreasing stress levels (Tabak et al., 2015). The social environment of the workplace is even effective on the nutrition and food choices employees make, and is influential on physical well-being (Tabak et al., 2015).

Subjective well-being (SWB) can be described as the positive and negative evaluations individuals make of their lives, and is commonly measured with self-report instruments on their emotional state, or their level of satisfaction on various aspects of their lives (Bryson et al., 2017). SWB has been able to predict individuals' future health, quality of life and job performance (Cooper et al., 2010). Higher SWB scores in work environments have shown a clear and positive relationship between work performance (Bryson et al., 2017), and in residential environments higher SWB scores are positively related with higher satisfaction scores of the living environment (Zhang & Zhang, 2017). Henceforth it could be said that Post Occupancy Evaluations (POE) could be used to assess well-being in specific environmental contexts (Clements-Croome, 2013).

POEs main function is to measure the performance of built environments by combining physical and psychological aspects of the environment and focuses on the user satisfaction to evaluate the intended levels of performance (Clements-Croome, 2013). POEs are influential in the environmental psychology field and architecture to evaluate a built environment's design and user demands (Davis, 2011). In seafaring context, satisfaction of seafarers about their vesselboard comfort is influential on crew continuity and professional competence (Arslan & Er, 2007). High levels of satisfaction with life indicates enhanced well-being and increases work-place performance (Gökçek & Tavacıoğlu, 2018). According to Lützhöft et al. (2017) concepts from social psychology and architectural design can be used to develop ship accommodation design to reflect personal and social needs, thus a POE could be



utilized to assess the overall satisfaction of accommodation areas by seafarers on environmental satisfaction and well-being.

### **3.3. Characteristics of Environments that Support Well-Being**

The characteristics of an interior space can cause environmental stress, resulting in adverse situations or they could be supportive of well-being by aiding relaxation and promoting social bonds (Colenberg et al., 2021). Positive emotions affect well-being by preventing maladaptive health outcomes (McVeigh et al., 2017). So what are the characteristics of environments that are supportive of their occupants' well-being? And if, in order to develop where seafarers' daily lives commence on sea, concepts from social psychology and architectural design can be applied (Lützhöft et al., 2017), could research from other fields relate to seafaring in a design and well-being context?

Design of healthcare facilities and their effects on patient well-being has been the subject of many research, and Ulrich's Theory of Supportive Design has been found to be prevalent and is being often used to interpret the needs of hospital occupants as a guideline (Andrade & Devlin, 2015; McCuskey Shepley, 2006). Supportive design theory suggests that the environments of healthcare facilities are effective in boosting stress reduction and restoration of health (Cheruiyot, 2018). Ulrich (1991) states in his Theory of Supportive Design; in order for an healthcare environment to be supportive of well-being, the following aspects should be present:

- Social support,
- A sense of control of the environment,
- Access to positive distractions,
- Lack of negative distractions.

Golembiewski (2010) suggests a salutogenic approach focusing on the characteristics keeping occupants healthy, and proposes Sense of Coherence, cultivated by architecture with the following approaches:

- Comprehensibility; awareness of textures, materials, size of spaces
- Manageability; allowances of control over environments
- Meaningfulness; augmented environments providing an environment that is complex, rich and likable.

On a similar note Kaplan (2001) describes characteristics of restorative environments as:

- Being away; the occupant is able to think of other, less mentally exhausting things.
- Extent; the occupant is in an environment that is different from their everyday settings, physically or mentally.

- Fascination; the occupant experiences a stimulus that captivates their involuntary attention, which allows them to function without directed attention.
- Compatibility; the occupant is able to do what they can and wish to, and the environment is compatible with the actions and inclinations (Kaplan, 2001).

Restorative environments are effective in management of mental fatigue (Kaplan, 2001). Some of the symptoms of reduced attention are loss of concentration, irritability, impulsiveness and reduced ability to make and follow pre-planned activities (Ouelette et al., 2005) which is very similar to fatigue. Restorative environments allow the occupants a room to recover their directed attention by stimulating a different variety of attention; a fluid and easy one (Ouelette et al., 2005). The effortless attention associated with soft fascination may appear within many contexts, such as natural environments and space for reflection (Ouelette et al., 2005).

Even though seafarers are not patients, their recreational environments could benefit from the same extrapolations. Previous studies have shown that the proper use of recreational zones in vessels had a positive relation with satisfaction of life within a Turkish seafarer group (Gökçek & Tavacıoğlu, 2018). Engaging in recreational activities has a positive association with life satisfaction and a negative association with anxiety, depression and social isolation, and is thus predictive of enhanced well-being and health (Gökçek & Tavacıoğlu, 2018). However due to heavy workload,

reduced crew numbers, decreased port times and the nature of the ships, seafarers have little opportunity to participate in recreational activities of their choice and thus it could be difficult for them to unwind from the stress of the daily work (Doyle et al., 2015).

### **3.4. Examples of Recreational Zones in Ships**

Ships are designed by naval architects - analogous to architects on land - by considering the size, speed, manoeuvrability and; exterior and interior design of the vessel (Lützhöft et al., 2017). Design process of a ship is heavily influenced by the technical and economical criteria whereas social criteria has limited effect on a new ship (Rogne, 1974). The traditional social structure on board can be physically seen in how the superstructure is designed in some vessels; separate mess rooms and day rooms for officers and crew and difference of quality in materials used overall in accommodation areas signify a strict hierarchy within the social structure (Rogne, 1974). An example of a recreational area on board a Russian fishing vessel with strong hierarchical structure compared with a Norwegian fishing vessel with an open-plan can be seen in Figure 1 and Figure 2.

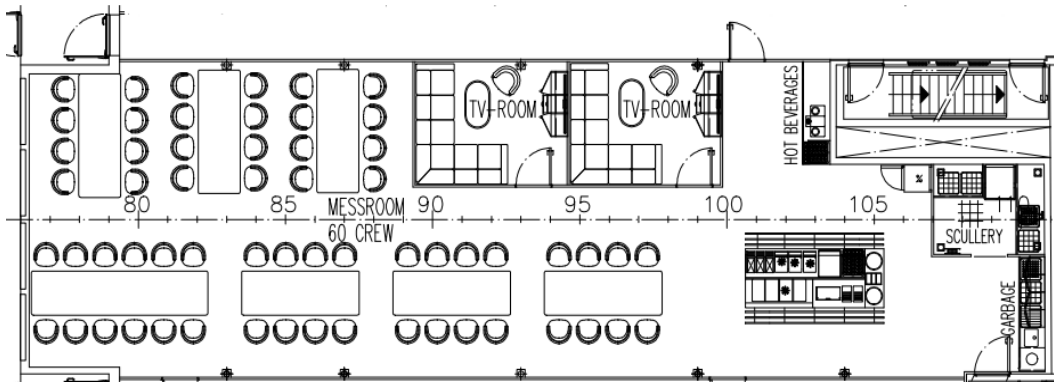


Figure 1. Partial plan of recreational zones of a trawler fishing vessel.

Source: Skipsteknisk AS

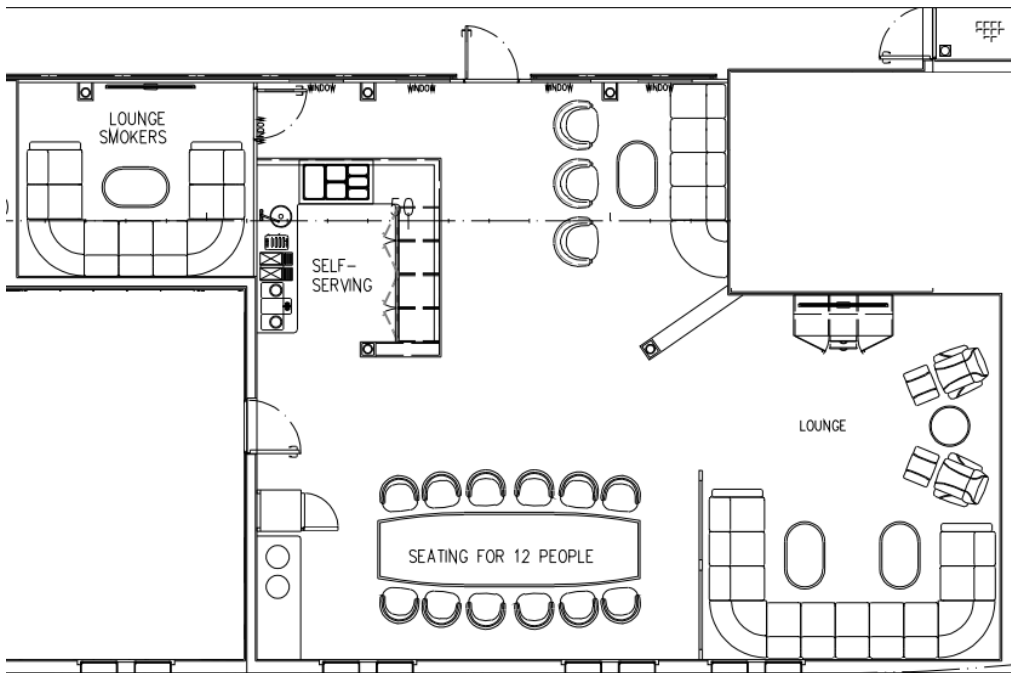


Figure 2. Partial plan of recreational zones of a longliner fishing vessel.

Source: Skipsteknisk AS

On open plan mess room and day room complexes, these areas are connected to each other (Figure 3 & Figure 4), however some ships require these areas to be separated per the organizational structure and ship's purpose (Figure 5 & Figure 6).

Recreational facilities may include media rooms, gymnasiums, quiet lounges and in some cases, even discos on some vessels (Figure 7).



Figure 3. Joint messroom and dayroom of a Norwegian fishing vessel view from quiet lounge.

Source: Tersan Shipyard Archives



Figure 4. Joint messroom and dayroom of a Norwegian fishing vessel view from mess room.

Source: Tersan Shipyard Archives



Figure 5. Separated mess room and day room of a multi-purpose platform supply vessel.

Source: Tersan Shipyard Archives



Figure 6. Separated mess room and day room of a multi-purpose platform supply vessel.

Source: Tersan Shipyard Archives





Figure 7. Disco and bar on crew deck on Norwegian Breakaway passenger vessel.

(Source: <https://crew-center.com/crew-bar-disco-norwegian-breakaway>)

As the nature of the ship operations dictate, many seafarers work 14 to 16 hours a day, for weeks and sometimes months even though the standards set by International Labour Organization (ILO) on working hours (Suppiah, 2009) and life aboard fishing vessels is characterized by cycles of working, eating and sleeping; working hours may increase with bigger catches of fish, and in this limited space working is monotonous and tiring (Zincirkiran Can, 2021). Lesser time spent in cabins and recreational zones is indicative of higher workloads, which results in the spare time of the seafaring individual to be spent more in cabins than participating in leisure activities (Pauksztat, 2017).

If a fishing vessel's recreational zones are examined, it can be seen that 2 types of main areas are found, apart from gymnasiums. Dining areas, which are called mess rooms, and lounging areas which are called day rooms or lounges, interchangeably. Mess rooms consist of food and beverage serving countertops, food storage equipment and dining tables with seats, whereas day rooms are characterized by more comfortable seating options such as sofas or single recliner chairs, TV units and decorative units such as fireplaces or plant boxes. The partial plan from a trawler type fishing vessel with the accommodation for 38 crewmembers can be seen below (Figure 8):

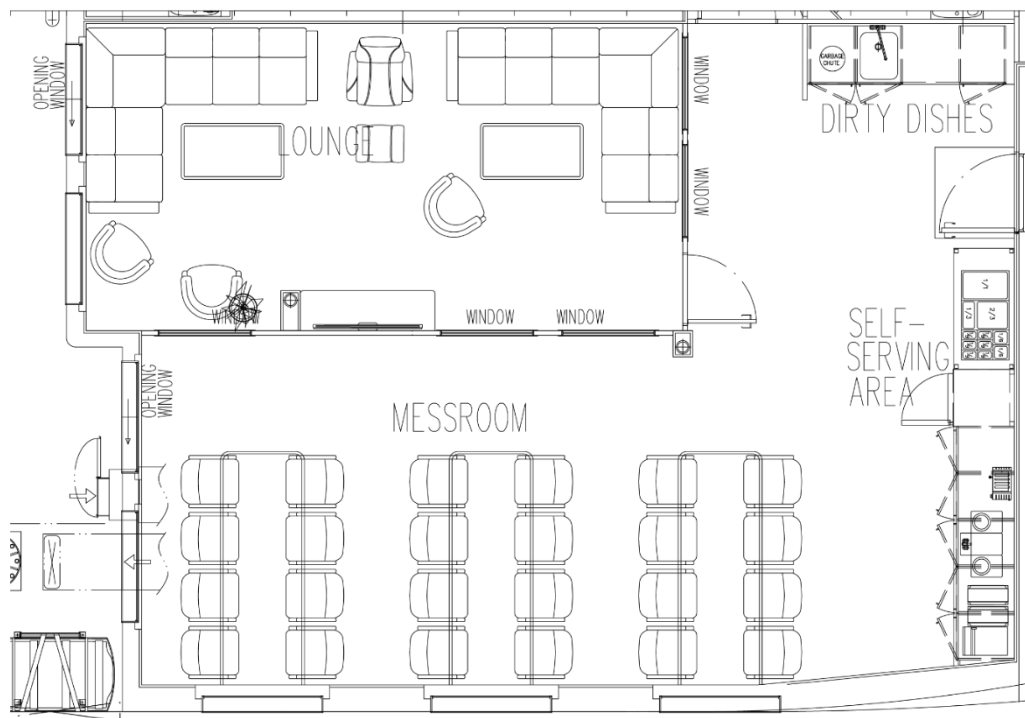


Figure 8. Partial plan of recreational zones in trawler fishing vessel.

(Source: Skipsteknisk AS)

The mess room part of the recreational area shown in Fig. 8 is placed on the starboard side of the vessel – which is the right hand side on a watercraft, when facing forward (Steffy, 2012)- and consists of two countertops, one for the service of food and beverages, and the other for the retrieval of dirty plates and serviceware. Three identical rectangular tables accessed by a single passageway, placed in a singular line next to windows, allow for seating of 8 crewmembers each.

Even though the plans may vary from each other, the building materials used in commercial vessels vary little (Tersan Shipyard Archives). For walls, which are called bulkheads; galvanized steel sandwich panels with rockwool cores, covered with Polyvinyl Chloride (PVC) to marine plywoods laminated with High Pressure Laminate (HPL) and for ceiling covering, electrostatic painted steel panels are used. Vinyl top floor coverings are a popular choice for their durability, hygiene and ease of maintenance with wood patterned ones heavily seen in public areas. For upholstered furnitures leather is a sensible and widely selected choice for cleaning purposes, and for the wooden furniture marine plywood with solid wood or aluminum profile edges are preferred (Tersan Shipyard Archives). The colors and finishes for these materials are varied and are combined with each other for different looks and designs.

If the mess room is thought of as a cafeteria, challenges in this arrangement is the amount of distance in between crewmembers seated at table, the service area and its usability, the circulation zone for tables and the social atmosphere that would be present while meals are served. The visual connection between outside world and

mess room is only present via the windows placed on starboard side of the vessel and backmost side of the accommodation area overlooking the 1st deck. Internal visual connection between mess room and dayroom is viable with the half-length frosted glass panels with company logo, which allows for some light to pass and creates a privacy panel dividing two rooms (Figures 9 and 10).



Figure 9. Serving areas of mess room

Source: Tersan Shipyard Archives



Figure 10. Tables and windows in mess room, partial view of day room with separating door.

Source: Tersan Shipyard Archives

The day room of the trawler which is separated from the mess room by a door, has 2 sectional sofas and 4 single chairs - one of which is a recliner - as well as a TV unit. The two sectional sofas are placed side by side, oriented towards the TV unit and mess room. The above mentioned frosted glass panels allow for some daylight to pass through, however the other windows placed on aft bulkhead of the vessel provide views mainly from the Main Deck of the vessel, where working activities commence. A decorative wall panel with hand painted tiles and luminaires is placed above the two sofas. The main function of this lounge is watching TV. Figures 11, 12 and 13 shows details from the dayroom.



Figure 11. Sofas, chairs, decorative wall and TV unit in dayroom.

Source: Tersan Shipyard Archives



Figure 12. View from aft windows, blocked by equipment and ship deck.

Source: Tersan Shipyard Archives



Figure 13. TV Unit in day room.

Source: Tersan Shipyard Archives

Sociopetality and sociofugality are important aspects to consider as well since mess rooms and day rooms can be thought as semi-public places. Sociopetality is defined as socially encouraging arrangements, that allow users to be seated face to face and configured in a way that is enhancing social interaction (Naghiloo & Falahat, 2016). Sociofugal on the other hand, refers to spaces which are configured in a way that is inhibitive of social interaction with back to back placed chairs, and preventive design

features for eye contact (Naghiloo & Falahat, 2016). Insufficient social space is associated with negative outcomes and is effective on evaluation of a space by the occupants (Meagher & Marsh, 2017). Furthermore, the design of a space is able to effectively transform the social affordances the space might have (Meagher & Marsh, 2017).

Based on the literature review until this point, this area can be thought as both a cafeteria or a restaurant, as well as a relaxing space, and as a break room from work and also a working space for the crewmembers with occupations regarding food service and cleaning. If concepts from other branches of social psychology and architecture can be thought to be applied on seagoing vessels (Lützhöft et al., 2017), then some of the research on the evaluation of these types of spaces focus on layout, spaciousness (Adriaanse, 2007; Frontczak et al., 2012; Tuzunkan & Albayrak, 2016), indoor environmental conditions such as ventilation, illumination, noise (Kwon et al., 2019; Paul & Taylor, 2008; Stans et al., 2017; Tuzunkan & Albayrak, 2016), pleasantness properties (Adriaanse, 2007; Boyle et al., 2019; Paul & Taylor, 2008) and restorativeness (Kaplan, 2001).

## **CHAPTER 4**

### **METHODOLOGY**

This chapter covers the methodology of the research, starting with the research questions that are identified by the aim of the study, then followed through by the demographic description of the participants. The procedure and instruments for the study are explained next, followed by the pilot study. Lastly the analysis of quantitative and qualitative data is reported.

As previously mentioned, the aim of the study is to explore the relationship between the interior design characteristics of fishing vessels and their effects on the seafarers' well-being and fatigue. By referring to the literature review the following research questions were asked.



#### **4.1. Research Questions**

Based on the literature review, the following research questions & related hypotheses were asked.

**RQ1:** Do different interior design characteristics result in different evaluations in recreational zones?

**RQ1a:** Do different interior design characteristics in terms of layout result in different evaluations of recreational zones?

**RQ1b:** Do different interior design characteristics in terms of restorativeness result in different evaluations of recreational zones?

**RQ1c:** Do different interior design characteristics in terms of indoor environmental factors result in different evaluations of recreational zones?

**RQ1d:** Do different interior design characteristics in terms of pleasantness result in different evaluations of recreational zones?

**RQ2:** Is there a relationship between seafarers' evaluation level of recreational zones and types of well-being?

**RQ2a:** Is there a relationship between the evaluation levels of recreational zones and general well-being?

**RQ2b:** Is there a relationship between the evaluation levels of recreational zones and physical well-being?

**RQ2c:** Is there a relationship between the evaluation levels of recreational zones and social well-being?

**RQ2d:** Is there a relationship between the evaluation levels of recreational zones and hedonic well-being?

**RQ3:** Is there a relationship between seafarers' evaluation level of recreational zones and fatigue?

**H1:** Different interior design characteristics have a significant impact on seafarers' evaluations of recreational zones.

**H1a:** Different interior design characteristics have a significant impact on seafarers' evaluations of recreational zones in terms of layout.

**H1b:** Different interior design characteristics have a significant impact on seafarers' evaluations of recreational zones in terms of restorativeness.

**H1c:** Different interior design characteristics have a significant impact on seafarers' evaluations of recreational zones in terms of indoor environmental factors.

**H1d:** Different interior design characteristics have a significant impact on seafarers' evaluations of recreational zones in terms of pleasantness.

**H2a:** There is a positive and significant relationship between seafarers' overall evaluation levels of recreational zones and general well-being.

**H2b:** There is a positive and significant relationship between seafarers' overall evaluation levels of recreational zones and physical well-being.

**H2c:** There is a positive and significant relationship between seafarers' overall evaluation levels of recreational zones and social well-being.

**H2d:** There is a positive and significant relationship between seafarers' overall evaluation levels of recreational zones and hedonic well-being.

**H3:** There is a negative and significant relationship between seafarers' evaluation levels of recreational zones and fatigue.

The study consists of 2 stages, with Stage 1 being an online questionnaire designated to measure seafarers' general evaluations of their recreational zones, well-being and fatigue levels; whereas Stage 2 is a series of interviews held with seafarers' from aforementioned ships to gain insight into how the recreational zones are used, their relationships with well-being and how they could be improved.

#### **4.2. Participants & Settings**

The primary target group of this study is Norwegian Seafarers working in fishing vessels; the reason for selecting this group is to focus on vessels sailing under the same flag and similar social and organizational cultures, allowing the research to be focused on how different interior design characteristics affect the satisfaction levels, well-being and fatigue levels. In order to compare how the interior design characteristics might affect the seafarers' well-being and fatigue, 3 different designs of fishing vessels applied on 4 different boats built on the same shipyard and their crew members have been selected.

Vessels A, B, C and D are all deep-sea fishing vessels, with vessel B&C being true sister vessels having exactly the same designs and equipment. All vessels have varying interior design features for recreational zones and different squaremeters for each of recreational zones. The only common aspect between all vessels is the presence of a partially open plan of mess room and day room complex, and the food and beverage serving areas. (Figures 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25).

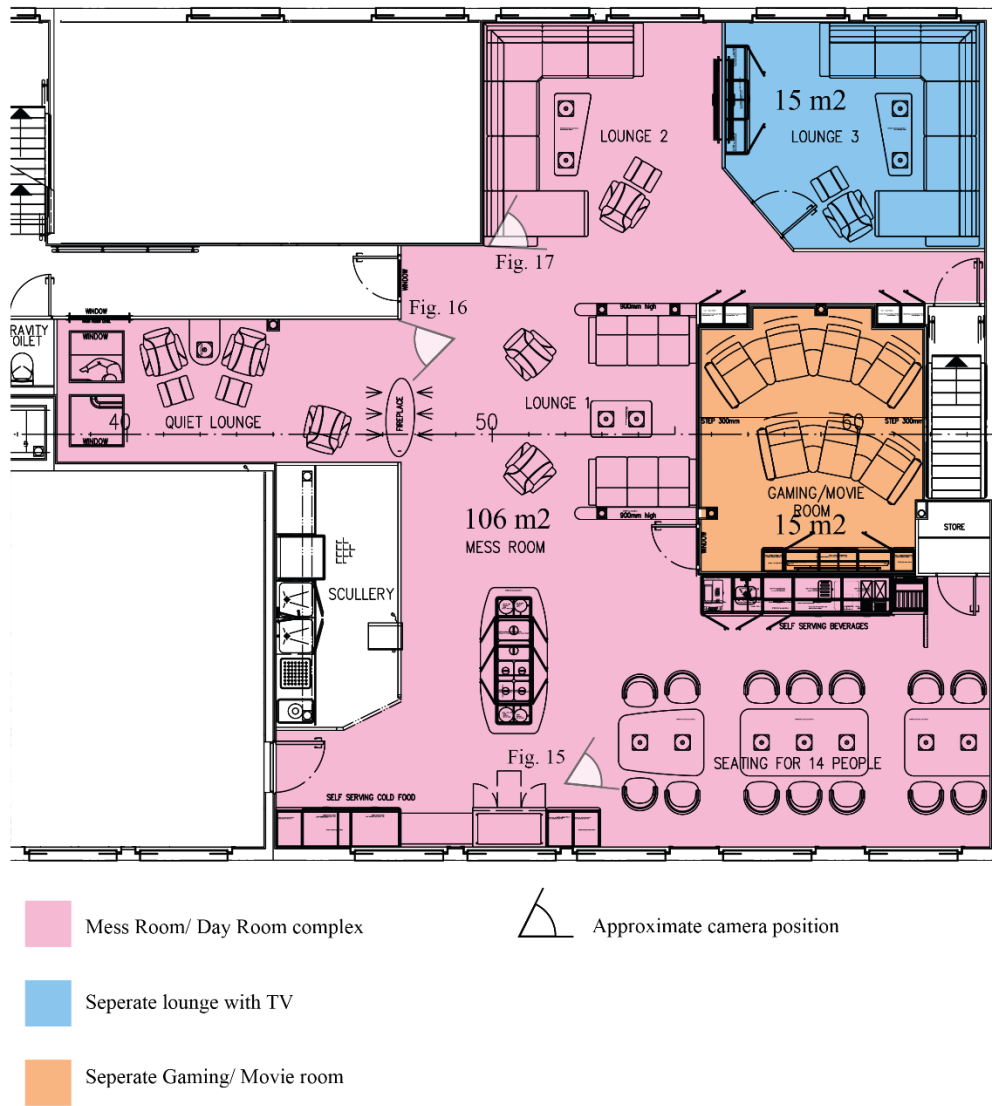


Figure 14. Partial plan of recreational zones of Vessel A.

Source: Skipsteknisk AS



Figure 15. Photograph from Vessel A - Mess Room tables and beverage serving area

Source: Tersan Shipyard Archives



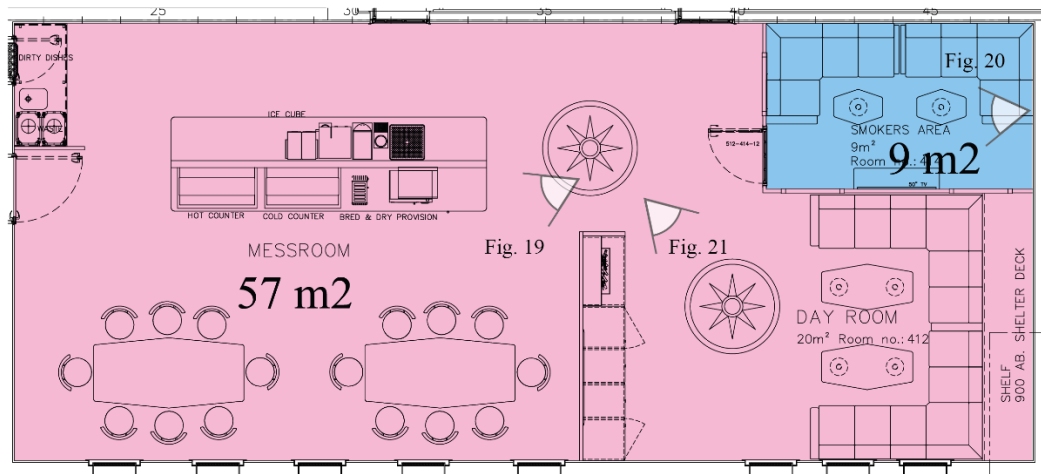
Figure 16. Photograph from Vessel A - view into the Quiet Lounge, fireplace, recliners & massage chairs

Source: Tersan Shipyard Archives



Figure 17. Photograph from Vessel A, view to Lounge 1 & Lounge 2 with TVs.

Source: Tersan Shipyard Archives



- Mess Room/ Day Room complex
- Seperate lounge with TV
- Approximate camera position

Figure 18. Partial plan of recreational zones of Vessels B&C.

Source: Marinteknikk AS



Figure 19. Photograph from Vessels B&C, mess room tables and serving area

Source: Tersan Shipyard Archive



Figure 20. Photograph from Vessels B&C, view from Smoker's Lounge, with TV and frosted glass windows into mess room.

Source: Tersan Shipyard Archive





Figure 21. Photograph from Vessels B&C, view into Day Room with sectional sofa, artwork on wall and decorative motif on floor.

Source: Tersan Shipyard Archive

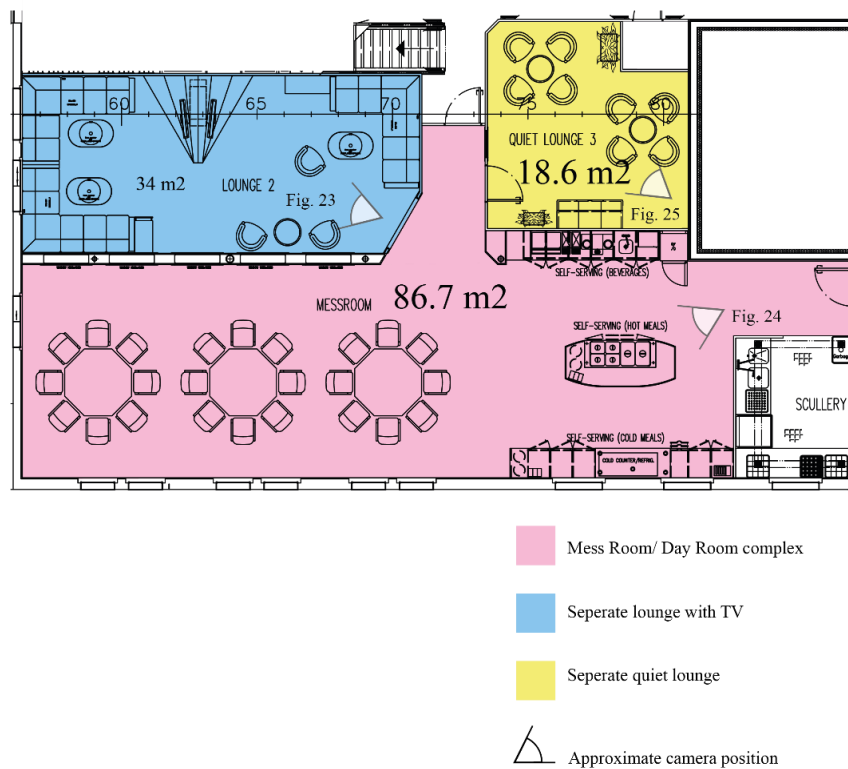


Figure 22. Partial plan of recreational zones of Vessel D.

Source: Skipsteknisk AS



Figure 23. Photograph from Vessel D, view into day rooms, foreground recliners, background fireplace, TV and sofas.

Source: Tersan Shipyard Archives



Figure 24. Photograph from Vessel D, view into mess room, foreground service area, background round tables.

Source: Tersan Shipyard Archives



Figure 25. Photograph from Vessel D, view into Quiet Lounge, recliner chairs.

Source: Tersan Shipyard Archives

Vessels A, B&C and D have different interior design characteristics; however most of the used materials, ceiling heights and the flag under which the vessel sails and thereby the rules which they have adhered to during the building process are the same (Tersan Shipyard Archives).

Purposive sampling has been used to reach aforementioned vessels with which the author previously had professional contact for the online survey. For the interviews, purposive sampling followed with snowball sampling has been used to reach seafarers working in the selected vessels for the study. For purposive sampling,

expert-sampling method has been utilized as a starting point with ship owners and project managers who supervised the process during the time when all 5 vessels were built and had detailed information about the design of recreational zones, followed up by the actual crews of the selected vessels.

As the study is focused on how the interior design characteristics of the vessels affect the seafarers' in several dimensions, it was important that the vessel projects were available and similar to some extent, such as the crew number, project completion date and facilities on board the vessels. Comparison of vessel lengths, their respective square meters for recreational zones and the number of people they are able to accommodate is summarized in table 1 below.

Table 1. Comparison of vessels

<b>Vessel Code</b>	<b>Type of vessel</b>	<b>Size of recreational zones in square meters</b>	<b>Number of people in accommodation</b>	<b>Placement of mess rooms and day rooms</b>	<b>Dining area arrangement</b>
Vessel A	Combined Longliner / Danish Seiner	135	25	Starboard through Portside, 4 lounges, 1 mess room, 1 quiet lounge	2 octagonal tables in one line, 14 people
Vessels B & C	Longliner	76	18	Starboard, 2 lounges, 1 mess room, 1 quiet lounge	2 elongated hexagonal tables, 16 people

Table 1. (cont'd)

Vessel D	Freezer Trawler	142	40	Starboard Aft side, 1 lounge, 1 mess room, 1 (previously) quiet lounge	3 hexagonal tables, 24 people
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Due to the nature of the study and COVID-19 pandemic, both stages of the study were done online. Participation was entirely voluntary and no rewards were offered. Stage 1 consisted of 34 participants from 4 different vessels with 3 different designs. Stage 2 consisted of 10 participants from different occupation groups. Duration for Stage 1 was 8 weeks whereas for Stage 2, the duration period was 7 weeks.

### 4.3. Method of the Study - Stage 1

#### 4.3.1. Instruments and Procedure of the Study

The survey utilized in Stage 1 of the study consists of three parts. First part is a questionnaire prepared by the author, designed to measure the general satisfaction levels of seafarers in recreational zones in several different aspects such as; general satisfaction levels, satisfaction with layout, physical environmental factors affecting comfort, pleasantness of the environment, restorative properties of the environment and the evaluation of the dining area. The custom questionnaire is preceded by demographics and work experience questions, and how an average day of a seafarer is divided in between working, resting and recreational zones in a vessel, and is then followed up by Well-Being Scale (WeBS) (Lui & Fernando, 2018) and Piper Fatigue Scale (PFS) (Piper et al., 1998).

The author prepared questionnaire's main themes have been prompted from several studies on POEs and residential satisfaction as well as ART and restaurant studies (Adriaanse, 2007; Boyle et al., 2019; Frontczak et al., 2012; Kaplan, 2001; Kolcubaşı & Erginer, 2020; Korpela & Kinnunen, 2010; Kwon et al., 2019; Paul & Taylor, 2008; Stans et al., 2017; Tuzunkan & Albayrak, 2016), which led to the emergence of some sub-themes in the questionnaire. Moreover, the common and different points of all three recreational zones designs were considered, as there is a lack of an evaluation covering the interior design characteristics of recreational zones in ships in general.

Some points considered in all the recreational zones were that they had dedicated spaces for TV watching as well as areas without TVs, a dining table arrangement consisting of two or more tables with different shapes from vessel to vessel, having an open-plan or not, a serving area with a serving unit placed as an island. Even though all vessels were built under Norwegian flag with similar regulations and rules, the fact that structural characteristics might affect the indoor environmental factors such as lighting, noise, air quality and thermal comfort were considered, so the indoor environmental factor questions were blended into the questionnaire as well.

WeBS and PFS are standardized instruments. WeBS is a scale designed to measure well-being with several subscales, including but not limited to physical well-being, social well-being, hedonic well-being and eudaimonic well-being (Lui & Fernando, 2018). For the purpose of this paper only general well-being, physical well-being, social well-being and hedonic well-being subscales have been considered, and eudaimonic well-being has not been considered, as eudaimonic well-being is considered to be more about self-growth, and less about physical or psychological functioning (Dodge et al., 2012). Whereas PFS is another standardized tool, used to measure the fatigue of individuals and the duration of it (Piper et al., 1998), and has been used in seafaring context before successfully (Bal Beşikçi et al., 2015).

The questionnaire has been prepared and applied by Google Forms and an email has been sent to fishing ships' captains or officers, explaining the nature of study and asking them to share the questionnaire with their crews (see Appendix B). Data has been collected by a survey form including Likert type, multiple choice and paragraph type questions as well as WeBS (Lui & Fernando, 2018) and PFS (Piper et al., 1998). The Analysis process has been done in IBM SPSS 19. To test the reliability of the questionnaire prepared by the author, a reliability test has been run with the result of a Cronbach's alpha value of 0.946, which indicates high reliability and consistency for the survey questions (Tavakol & Dennick, 2011). WeBS and PFS as ready to use instruments have not been evaluated with a reliability test.

#### 4.3.2. Questionnaires

The questionnaire consists of 5 parts and 50 questions, essentially. The questionnaire starts by giving detailed information about the study and its nature and how the information will be analyzed by anonymizing the participants, and asks the informed consent of participants. First part consists of demographic questions, the second part consists of an evaluation of the time spent in recreational areas per day. The third part consists of the evaluation of recreational zones in terms of layout, pleasantness, indoor environmental factors, time spent and restorativeness with a 5-point Likert-scale type questionnaire, followed by open ended questions on how to improve the recreational zones and current adversities in recreational zones.

Tables 2, 3, 4, 5 and 6 demonstrate the sources from which the themes of the questions were extracted. Some of the questions were developed after comparing the plans of the vessels together and finding the common zones and facilities. For instance TV dedicated spaces were common in all 3 plans, therefore the amount of TVs and placement of TVs were specifically asked.

Table 2. Layout Evaluation questions in author prepared survey

#### LAYOUT EVALUATION

Q1	Environment's layout is satisfactory	<ul style="list-style-type: none"><li>● Adriaanse, 2007</li><li>● Tuzunkan &amp; Albayrak, 2016</li></ul>
Q7	Environment is spacious	<ul style="list-style-type: none"><li>● Frontczak et al., 2012</li></ul>
Q8	Environment has enough seating units	



Table 2. (cont'd)	
Q17	Environment's dining table arrangement
Q18	Environment's serving area arrangement
Q20	Environment's serving area's ease of use
Q21	Distance between chairs at dining tables
Q22	Amount of TVs in environment
Table 2. (cont'd)	
Q23	Recreation options in environment
Q24	Amount of TVs in environment
Q25	Placement of TVs in environment

Table 3. Pleasantness Evaluation questions in author prepared survey

### PLEASANTNESS EVALUATION

Q6	Social pleasantness	<ul style="list-style-type: none"> <li>● Boyle et al., 2019</li> </ul>
Q19	Aesthetic quality	<ul style="list-style-type: none"> <li>● Boyle et al., 2019</li> <li>● Paul &amp; Taylor, 2008</li> </ul>
Q26	Physical Pleasantness	<ul style="list-style-type: none"> <li>● Boyle et al., 2019</li> </ul>
Q27	Positive feelings about environment	<ul style="list-style-type: none"> <li>● Adriaanse, 2007</li> <li>● Boyle et al., 2019</li> </ul>

Table 4. Indoor Environmental Factors Evaluation questions in author prepared survey

<b>INDOOR ENVIRONMENTAL FACTORS EVALUATION</b>		
Q9	Converse easily in the environment	● Stans et al., 2017
Q10	Environment provides comfort	
Q13	Satisfactory illumination in environment	● Tuzunkan & Albayrak, 2016 ● Paul & Taylor, 2008
Q14	Satisfactory ventilation in environment	● Paul & Taylor, 2008
Q15	Satisfactory air quality in environment	● Kwon et al., 2019
Q16	Satisfactory noise level in environment	● Paul & Taylor, 2008 ● Tuzunkan & Albayrak, 2016

Table 5. Evaluation of amount of time spent question in author prepared survey

<b>AMOUNT OF TIME SPENT EVALUATION</b>		
Q2	The amount of time spent in environment is satisfactory	● Korpela & Kinnunen, 2010

Table 6. Restorativeness evaluation questions in author prepared survey

<b>RESTORATIVENESS EVALUATION</b>		
Q3	Feeling relaxed when in the environment	● Kaplan, 2001
Q4	Feeling mentally renewed when in the	● Kaplan, 2001

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environment

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Table 6. (cont'd.)

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Q5	Feeling rested when in the environment	● Kaplan, 2001
Q11	Getting away from daily stressors when using the environment	● Kaplan, 2001
Q12	Reflect on thoughts when using the environment	● Kaplan, 2001

---

When the survey form was being composed, the electronic devices that the participants will use has been considered, and in order not to lead to fatigue, all questions have been grouped under 3, as the most number of questions that can be viewed from a smartphone screen at the same time. Therefore the final form had different numeration for questions than the original plan.

The 4th part of the survey is the WeBS by Lui & Fernando (2018) which is a standardized tool to measure well-being and its subscales by a 6-point Likert-scale questionnaire, the division of questions according to their specific subscales is given below in Figure 4. It is advised to use the means of Likert-scale questions of WeBS to determine the level of well-being with 6 being highest and 1 being lowest(Lui & Fernando, 2018). Subscales of the WeBS are shown below (Figure 26).

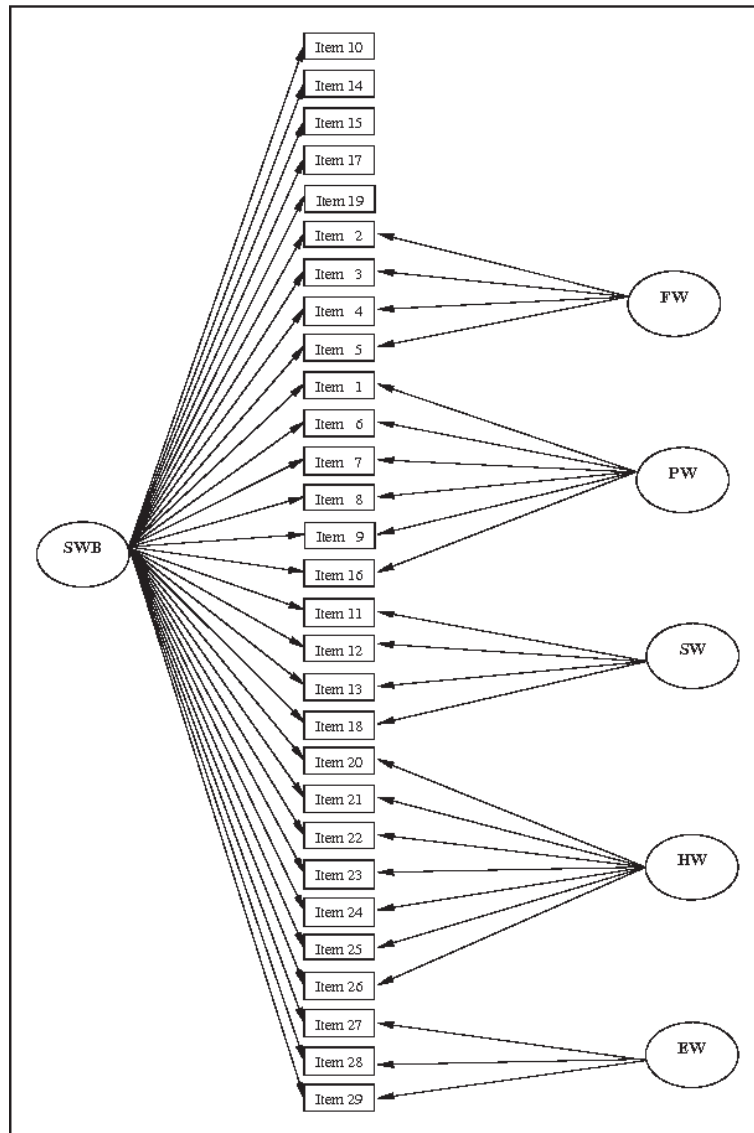


Figure 26. WeBS subscales according to questions, listed as Financial Well-being (FW), Physical Well-being (PW), Social Well-being (SW), Hedonic Well-being (HW) and Eudaimonic Well-being (EW).

(Source: Lui & Fernando, 2018, p.150)

The 5th and last part is the Piper Fatigue Scale (Piper et al., 1998). PFS begins by asking the duration of fatigue in participants and continues with 10 point Likert-scale type questions and ends with open ended questions, the recommendation is to use the mean of the Likert type questions, and use the other questions to determine the length

of fatigue and possible alleviation methods (Piper et al., 1998). The questionnaire concludes by asking the participants whether or not they would like to participate further in this study and if they would, to please leave their contact information.

#### 4.3.3. Pilot Study

Two pilot studies for the survey form was carried out in January 2021 with the participation of 6 individuals with Norwegian nationality in total, either with experience in the shipbuilding industry or currently working in a fishing vessel. Both pilot studies were in the form of online surveys, as the original study was also planned to be done asynchronously as an online form. In the first pilot study participants did not comment negatively to the survey and suggested the addition to collect the type of fishing vessels in which the future participants were working. After the application of this change the form was sent out to different individuals to evaluate and comment. No negative comments were collected, and the form was sent out with minor changes to the Ethics Committee of Bilkent University on 12th of February 2021, which was approved without revisions the following week with the number of 2021\_02\_22\_02 (see Appendix A).

One of the concerns of the pilot study was whether or not the participants would be able to understand the questions addressed which was explored with the last question of the form asking the participants whether or not they would prefer the form to be in their original language. Only one participant remarked that a form in their mother tongue would be preferable. Therefore the decision has been made to send out the final form in English as no problem was perceived by the rest of the participants.

## **4.4. Method of the Study - Stage 2**

### 4.4.1. Instruments and Procedure of the Study

In order to gain in-depth knowledge on the life of seafarers onboard fishing vessels, an interview was prepared and held with 11 individuals. The reason for using both interviews and a questionnaire was to gain detailed information about the life on board fishing vessels, and to be able to gather on point expressions on the specific areas of selected fishing vessels. After completion of Stage 1, 3 participants volunteered to hold interviews for Stage 2. Rest of the participants were found by the author, either with purposive sampling - for instance one interviewee managed the shipbuilding process for a vessel in the study, and another interviewee was firstly the captain of another vessel in the study, then an executive on the same company of the vessel. Snowball sampling was utilized additionally, by asking the participants if they knew other individuals who would like to participate in the study from the same ships. A more diverse range of answers on the same layout has been targeted by using these methods.

The interviews ranged from approximately 15 minutes to 45 minutes, and were held in Zoom, with the exception of 3 participants. Oral interviews were video-recorded or audio-recorded with the consent of participants and transcribed verbatim for analysis. One of the participants who held the interview face to face was present in the same city as the author at the time of study, and the other two had problems with internet connection thus the same questions were sent as a form (see Appendix C).

Rest of the participants had different roles in shipboard organizations. All interviews and forms were analyzed using Google Docs, using thematic analysis.

#### 4.4.2. Interviews

The interview questions prepared for Stage 2 of the study consists of two parts. 1st part is a short demographics survey preceded by an informed consent question and 2nd part consists of 9 questions designated to delve deeper into how seafarers life commences onboard, their opinions on well-being and its relationship with recreational zones, whether or not they are satisfied with their recreational zones, why and how the recreational zones are used the way they are, and how they could be improved.

The questions were of explorative nature, and were open ended to encourage participants to share their experiences and opinions. Thus the interview was held in a semi-structured way, when the author felt more answers could be extracted from the participant.

The application of mixed method in the form of Stage 1 and Stage 2 was due to the fact that mixed method studies integrating quantitative and qualitative research (Creswell, 1999) is able to give the subtle details of experiences by an individual (Klassen et al., 2012) and for clearer research outcomes (Malina et al., 2011). A summary of the research design can be seen in Figure 27 below:

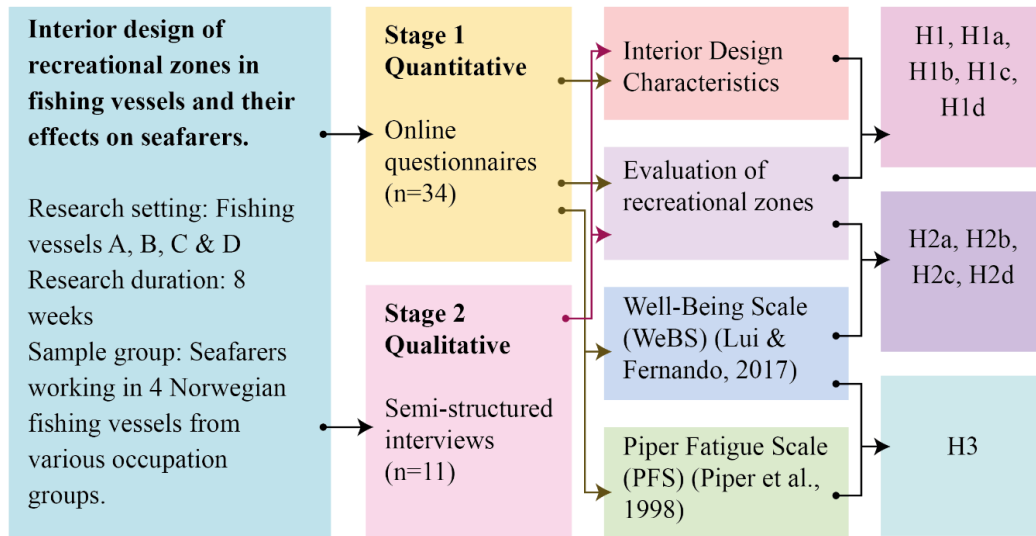


Figure 27. Summary of research design



## **CHAPTER 5**

### **RESULTS**

#### **5.1. Data Analysis**

This chapter will focus on the methods and the processes of how the data was analyzed during the study. Firstly Stage 1 is analyzed in quantitative and qualitative aspects, and then Stage 2 follows with a detailed examination of the interviews held over the 8 week period. Data analysis for this study has been done with IBM SPSS 19 and Google Docs.

#### **5.2. Results of Stage 1**

##### 5.2.1 Quantitative Analysis

###### 5.2.1.1. Descriptive Analysis

The demographics data has been analyzed by descriptive analysis methods. In total 34 seafarers participated in the first part of the study from 4 vessels which were Vessels A, B&C and D from different occupations, between ages 18 to 60, with a mean age of 39,29 (SD= 12,009). Majority of the participants were male (91,2%, n=34) and Norwegian (94,1%, n=34). Work experience on ships in years ranged

from 0.5 years to 45 years, with a mean of 16,441 years (SD= 12.9227).

Demographic information about the participants is summarized in Table 7 below.

Table 7. Summary of demographics

Source: Author prepared questionnaire

<b>DEMOGRAPHICS</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Gender (n=34)	Male	31	91.2	91.2	91.2
	Female	2	5.9	5.9	97.1
	Prefer not to say	1	2.9	2.9	100.0
Grouped Age (years) (n=33)	18-29	7	20.6	21.2	21.2
	30-39	13	38.2	39.4	60.6
	40-49	6	17.6	18.2	78.8
	50-59	6	17.6	18.2	97.0
	60-69	1	2.9	3.0	100.0
Nationality (n=34)	Norwegian	32	94.1	94.1	94.1
	Danish	2	5.9	5.9	100.0

Table 7 (cont'd)

Occupation on board (n=33)	Navigation Officer	10	29.4	30.3	30.3
	Operational personnel	1	2.9	3.0	33.3
	Fisher/Fish factory personnel	16	47.1	48.5	81.8
	Technical Personnel	4	11.8	12.1	93.9
	Steward	2	5.9	6.1	100.0
Grouped work experience (years) (n=34)	0-10	13	38.2	38.2	38.2
	11-20	11	32.4	32.4	70.6
	21-30	4	1.8	11.8	82.4
	31-40	4	11.8	11.8	94.1
	41-50	2	5.9	5.9	100.0
Type of fishing vessel being worked in (n=34)	Trawler	4	1.8	1.8	11.8
	Longliner	26	76.5	76.5	88.2
	Danish Seiner	3	8.8	8.8	97.1
	Other	1	2.9	2.9	100.0

A visual summary of demographics can be seen in Figures 28, 29, 30, 31 and 32 below.

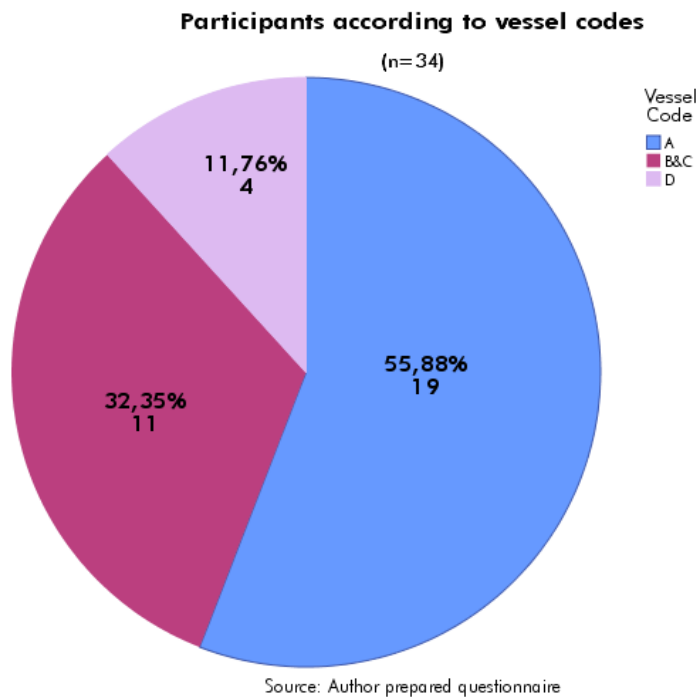


Figure 28. Pie chart of participants according to vessel codes

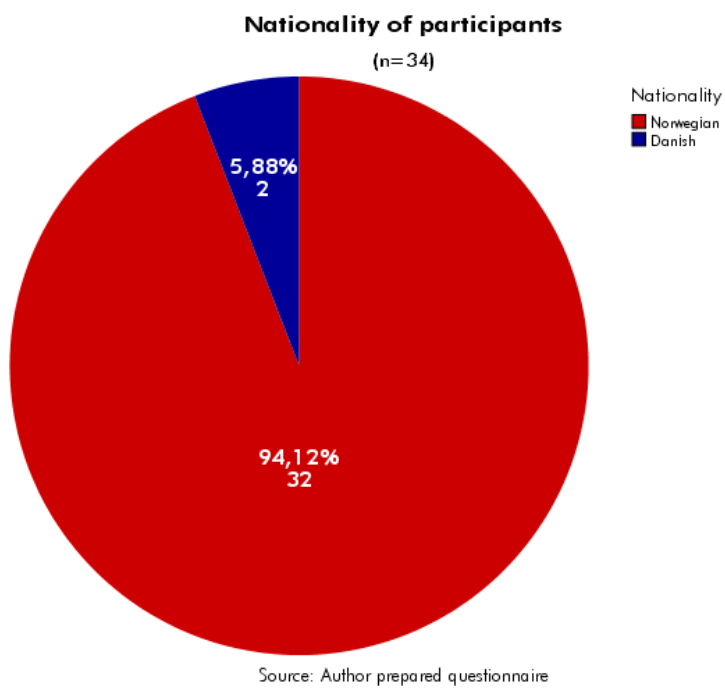


Figure 29. Pie chart of participants according to nationality

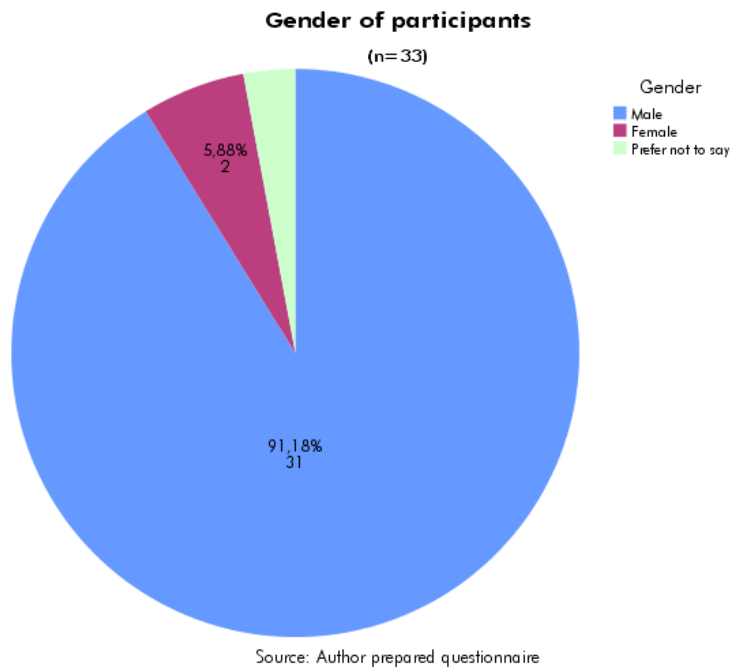


Figure 30. Pie chart of participants according to genders

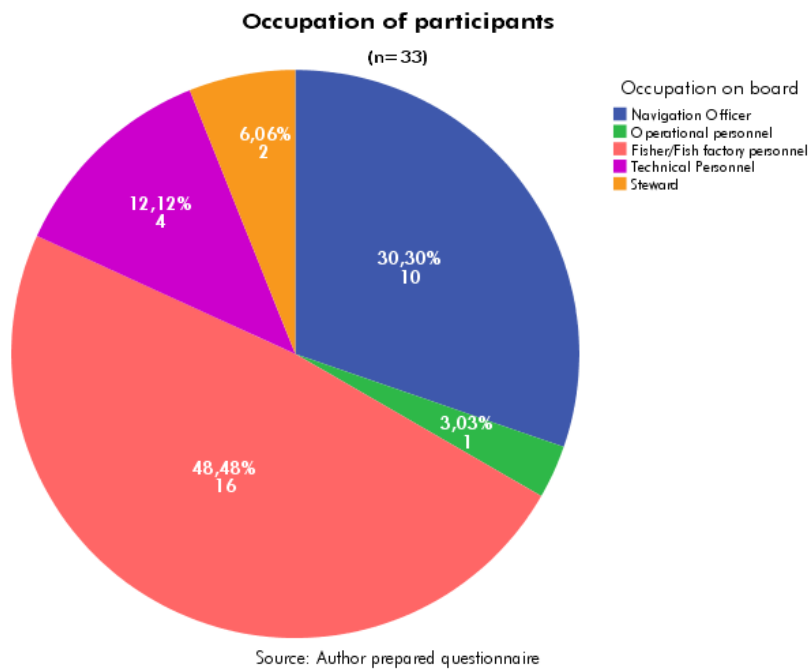


Figure 31. Pie chart of participants according to occupation

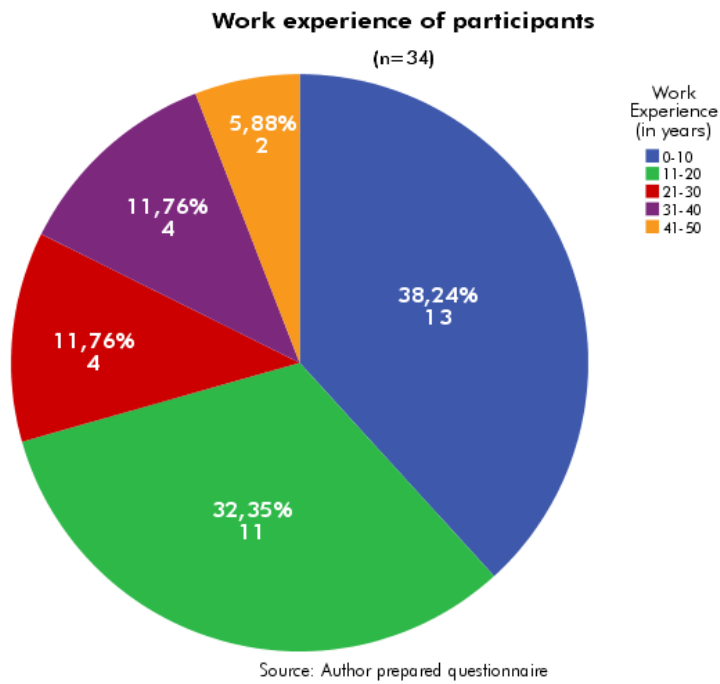


Figure 32. Pie chart of participants according to work experience

As for the comparison of times spent in working zones, recreational zones and sleeping zones, it was found that on average seafarers spent 8 hours or more in working zones, 4-6 hours in recreational zones and 6-8 hours in their cabins, which are their sleeping areas. Table 8 shows a summary of how much time seafarers spend in ship zones in a day.

Table 8. Summary of the amount of time spent in zones by seafarers

**AMOUNT OF TIME SPENT IN SHIP ZONES**

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Working</b>					
Zones (n=34)	4-6 hours	5	14.7	14.7	14.7
	6-8 hours	7	20.6	20.6	35.3
	8 hours or more	22	64.7	64.7	100.0
<b>Recreational</b>					
Zones (n=33)	0-2 hours	12	35.3	36.4	36.4
	2-4 hours	17	50.0	51.5	87.9
	4-6 hours	2	5.9	6.1	93.9
	6-8 hours	1	2.9	3.0	97.0
	8 hours or more	1	2.9	3.0	100.0
<b>Cabins</b>					
Zones (n=34)	0-2 hours	1	2.9	2.9	2.9
	2-4 hours	1	2.9	2.9	5.9
	4-6 hours	6	17.6	17.6	23.5
	6-8 hours	15	44.1	44.1	67.6
	8 hours or more	11	32.4	32.4	100.0

A visual summary of amount of time spent in different zones on board vessels is shown in Figures 33, 34 and 35 below:

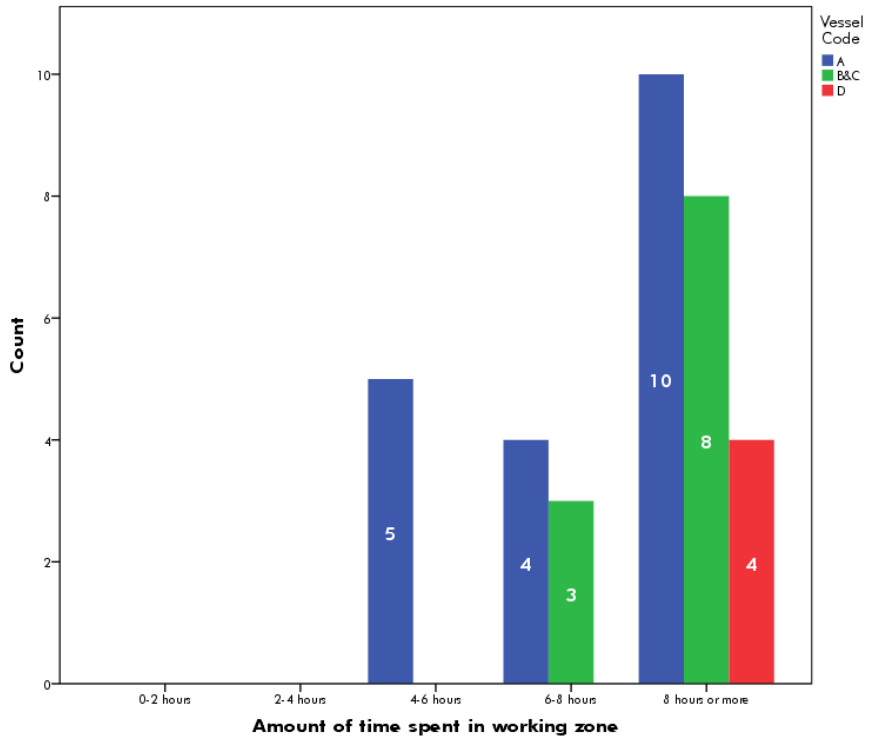


Figure 33. Bar chart of amount of time spent in working zone

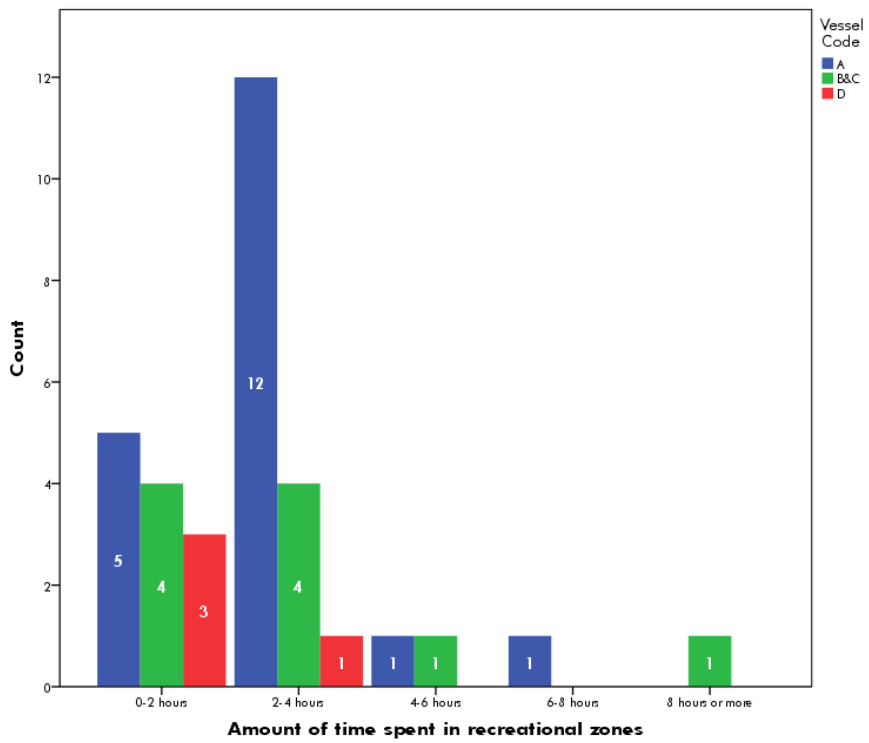


Figure 34. Bar chart of amount of time spent in recreational zones



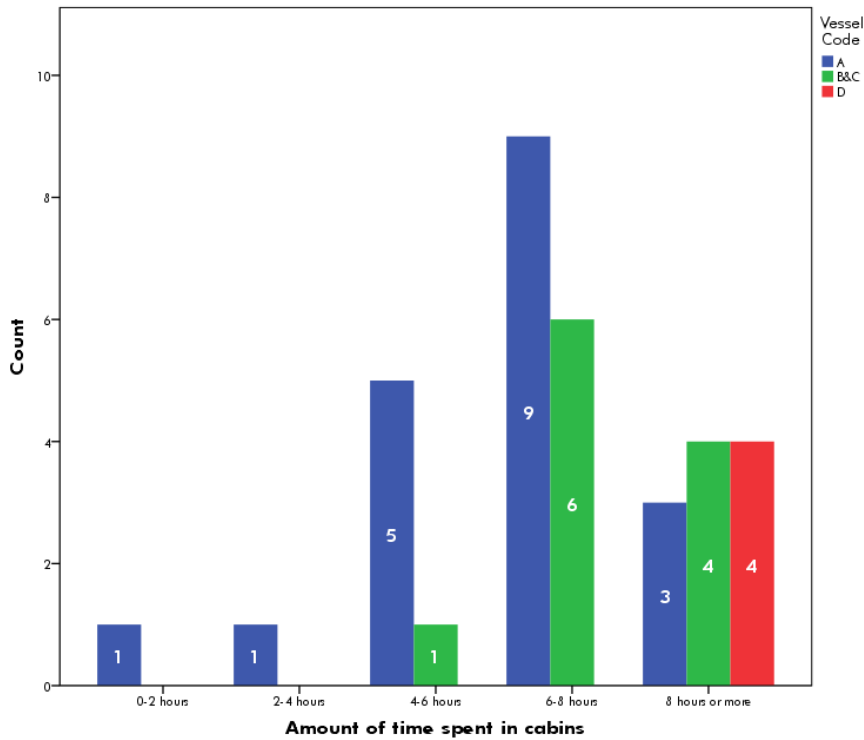


Figure 35. Bar chart of amount of time spent in cabins

#### 5.2.1.2. Inferential Analysis

For H1, H1a, H1b, H1c and H1d, the questionnaire prepared by the author has been evaluated with a Non-Parametric ANOVA test to see whether or not there were any differences between the medians for all 3 types of vessels evaluations in general, layout, restorativeness, indoor environmental factors and pleasantness terms. As Vessel B and Vessel C had the exact same design and colors being sister vessels, they were grouped under one name to have similarly numbered groups.

If mean ranks are examined it can be seen that Vessel A has ranked higher than the Vessels B&C and Vessel D in all categories of general evaluation, layout evaluation,

restorativeness evaluation, Indoor environmental factors evaluation and pleasantness evaluation (Table 9).

Table 9. Mean ranks between vessels and their evaluations of subscales from the evaluation of recreational zones.

<b>Mean Ranks</b>			
	Vessel		
	Code	N	Mean Rank
General Evaluation of Recreational Zones	A	19	19,66
	B&C	11	15,59
	D	4	12,50
	Total	34	
Layout Evaluation of Recreational Zones	A	19	19,58
	B&C	11	16,05
	D	4	11,63
	Total	34	
Restorativeness Evaluation of Recreational Zones	A	19	18,47
	B&C	11	17,45
	D	4	13,00
	Total	34	
Indoor Environmental Factors Evaluation of Recreational Zones	A	19	17,05
	B&C	11	17,95
	D	4	18,38
	Total	34	
Pleasantness Evaluation of Recreational Zones	A	19	19,00
	B&C	11	16,27
	D	4	13,75
	Total	34	

However no statistically significant difference has been found between vessels according to Kruskal-Wallis non-parametric ANOVA test alone. For H1 ( $\chi^2(2) = 2.315$ ,  $p = 0.314$ ), For H1a ( $\chi^2(2) = 2.511$ ,  $p = 0.285$ ), for H1b ( $\chi^2(2) = 1.023$ ,  $p = 0.600$ ), for H1c ( $\chi^2(2) = 0.096$ ,  $p = 0.953$ ) and for H1d ( $\chi^2(2) = 1.237$ ,  $p = 0.539$ ), these values show that a statistically significant difference is nonexistent between the vessels and their average evaluations of General, Layout, Restorativeness, Comfort, Pleasantness and Dining Areas (Table 15, see Appendix D.).

On the other hand the qualitative analysis of both Stage 1 and Stage 2 gives more insight into RQ1 and sub questions and indeed points out the characteristics that could make a recreational zone more efficient than others. Thus H1, H1a, H1b, H1c, H1d are not retained, and might require further investigation to understand which interior design characteristics are more satisfactory for seafarers, with different methodologies; notably qualitative ones.

For H2a, H2b, H2c and H2d, bivariate correlation method has been used to determine whether or not there is a relationship between two variables (general evaluation of recreational zones (independent variable) and subscales of well-being (dependent)) and the strength of the relationship if existing. Since all questionnaires employ different points of Likert scale, and variables are ordinal, Spearman's rho coefficient was preferred. In the case of H2a ( $r=0.560$ ,  $p<0.01$ ), H2b ( $r=0.504$ ,  $p<0.01$ ), H2c ( $r=0.464$ ,  $p<0.01$ ) and H2d ( $r=0.530$ ,  $p<0.01$ ) a positive relationship with moderate strength was found in between respective variables. Therefore H2a,

H2b, H2c and H2d are retained. For H2a, H2b, H2c and H2d the positive relationship of moderate strength is shown in Tables 16, 17, 18, 19 (see Appendix D).

As for the H3, the relationship between two variables (general evaluation of recreational zones (independent variable) and fatigue (dependent)) were of negative direction however were very weak and of negligible strength ( $r=-0.217$ ,  $p>0.01$ ), and thus H3 is rejected. Table 20 shows the results of the bivariate correlation test (see Appendix D).

#### 5.2.2. Qualitative Analysis

In order to understand the opinions on the current state of recreational zones and how to improve them, following the 5-point Likert type survey, two open-ended questions were included in the questionnaire. General opinions of the current state of recreational zones were positive to neutral, with all answers including a positive expression. Whereas when asked what could be improved the answers ranged from better thermal comfort to cell phone free zones. Table 10 depicts the answers for the improvement question:

Table 10. Answers to improvement question

**“Overall what do you think can be improved about Recreational Zones in vessels?”**

	Frequency
<i>“Nothing, evrything is ok” / “Nothing” / “Ingen Ting” / “I dont have any opinion, im happy as it is.”</i>	4
<i>“Not sure” / “Neutral” / “Dont know” / “I dont know”</i>	4
<i>“Ventilation” / “Better ventilation”</i>	2
<i>“more smart trainers” / “Better gym”</i>	2
<i>“Keep it like it is, here onboard we have 3 different lounges, With one being a quiet lounge. I'ts important that we can split up also.”</i>	1
<i>“a door closing it off from the mess”</i>	1
<i>“Self service cooler whit shelf's for plates whit food(Cold food like chees, ham,vegetables,eggs etc)”</i>	1
<i>“Make a cellphone FREE zone”</i>	1
<i>“Floor heating in better zones for adjustment”</i>	1

Based on these answers it could be said that there is room for improvement, especially regarding the environmental factors such as air quality, thermal comfort and the quantity of lounges. It could also be said that perhaps a too open-plan is not very desirable too, with some participants requesting doors separating areas or the need to split up. Even some very small details like a piece of equipment for self-serving areas are mentioned, or some cell-phone free areas are suggested,

presumably because of noise or social purposes. Different recreational rooms such as gymnasiums and their equipment have been mentioned as an additional note.

### **5.3. Results of Stage 2**

#### 5.3.1 Analysis Procedure of Interviews

To understand the opinions on interior design characteristics on recreational zones of seafarers, qualitative analysis was carried out in the form of interviews and open ended questions, by referring to RQ1 and RQ2. Thematic analysis, which is a method used for identifying and reporting common patterns or themes within a set of data, was employed (Nowell et al., 2017). Thematic analysis is especially useful for exploring the point of views of different participants (Nowell et al., 2017). Braun and Clarke (2006) describe the steps of thematic analysis as below:

1. Familiarization with data
2. Initial code generation
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Reporting

For the purpose of the study first of all the recreation zones, and which were important, were tried to be found according to their functions, followed by the activities and interior design characteristics. On a separate note, demographics, daily routine and positive expressions and negative expressions were searched and noted. All steps of thematic analysis have been applied.

For recreational zones the following main themes were generated:

#### FUNCTION

- Messroom
- Dayroom
- Media room
- Quiet Lounge
- Smoker's Lounge

For activities the following codes were generated:

#### ACTIVITY

- Eating: eat, meal, dinner, breakfast
- Socializing: socialize, talk, chat, conversation, speak

- Relaxing: relax, rest, massage
- Watching TV: TV, football match, movie, video

For interior design characteristics the following codes were generated:

#### INTERIOR DESIGN CHARACTERISTICS

- Layout & Furniture: layout, seat, round table, sofa, enough space on each side of the tables
- Degree of control: choose, dimmers, adjust
- Physical/Aesthetic Qualities: color, harmonic, look out a little bit, fireplace
- Sociopetal/ Sociofugal Qualities: shoulder to shoulder, social centerpoint, crowded
- Indoor Environmental Factors: noise, illumination, ventilation, smell, cold

For demographic characteristics the following codes were generated:

#### DEMOGRAPHIC CHARACTERISTICS

- Age



- Occupation: “as a captain, deckhand, engineer, fisherman, steward

For daily routine theme the following codes were generated:

#### DAILY ROUTINE

- Watch system: 6-6 hours watch, 6 on 6 off, 4 shifts a day
- Daily routine: after a hard shift, before shift, before bed
- Seasonal changes: heavy winter months
- Special event: Premiere League, football match, Saturday evenings

For expressions the following codes were generated:

#### EXPRESSIONS

- Positive: nice, happy, new energy
- Neutral: do not have any opinion
- Negative: fight for your space, not enough, too little

Based on these initial codes and indicators the following sub-themes emerged and were detailed according to frequently mentioned factors. Table 11 shows the themes and sub-themes emerged from the interviews.

Table 11. Emergent themes and detailed sub-themes

Main Theme	Sub-theme	Sub-theme (secondary)	Sub-theme (tertiary)
1. FUNCTIONS	1.1. Mess Room 1.2. Day Room 1.3. Quiet Lounge 1.4. Media Room 1.5. Smoker's lounge		
2. ACTIVITIES	2.1. Relaxing 2.2. Watching TV 2.3. Eating 2.4. Socializing 2.5. Have a break	2.2.1. Football match 2.2.2. News 2.2.3. Movie 2.3.1. Coffee 2.3.2. Dessert 2.4.1. Talk 2.4.2. Playing games 2.5.1. Smoking	
3. INTERIOR DESIGN CHARACTERISTICS	3.1. Layout 3.2. Furniture	3.1.1. Layout 3.2.1. Dining Furniture 3.2.2. Seating Furniture	3.1.1.1. Distance of circulation 3.1.1.2. Distance between subspaces 3.1.1.3. Degree of Separation and privacy 3.1.1.4. Distance /orientation from tv 3.1.1.5. Enclosed vs open space 3.1.1.6. Variety of spaces 3.2.1.1. Table type (round/oval , rect.)

		3.2.1.2. No. of tables
		3.2.2.1. No. of seats per table
		3.2.2.2. Seat type (sofa /chair/massage seat/recliner)
		3.2.2.3. Distance/orientation between seats
3.3. Degree of control	3.3.1. Choice 3.3.2. Adjustability	
3.4. Physical / Aesthetic Qualities	3.4.1 Color & Material 3.4.2. Visual connection 3.4.3. Artwork/Decorative elements	3.4.1.1. Interior surfaces 3.4.1.2. Furniture colors 3.4.2.1. Outside 3.4.2.2. Inside
3.5. Sociopetal / Sociofugal Qualities	3.5.1. Density 3.5.2. Personal space 3.5.3. Crowding 3.5.4. Degree of privacy	
3.6. Indoor Environmental Factors	3.6.1. Noise 3.6.2. Illumination 3.6.3. Ventilation 3.6.4. Air Quality 3.6.5. Thermal qualities	

4. DEMOGRAPHIC CHARACTERISTICS	4.1. Age 4.2. Occupation
5. DAILY ROUTINE	5.1. Watch system 5.2. Daily routine 5.3. Seasonal changes 5.4. Special event
6. EXPRESSIONS	6.1. Positive 6.2. Neutral 6.3. Negative

An example of how the interviews were analyzed is given in the 3 excerpts below:

You know we change the crew are going 6-6 watches on board(5.1.) , so after 6 hours watch (5.2.), they come inside(4.2.), they have the food and normally if not too tired after a day's work(4.2.) they sit down in the lounges (1.2.) to relax (2.1.). Some of them, they go to the more quiet lounges (1.3., 3.6.); they can sit by themselves (2.1.; 3.1.1.3); we have 4 lounges on board (3.1.1.6., 5.2.) so we have a lot of space (3.1., 3.3.1) , and some others, they like to sit down together, to sit and talk together, (2.4., 2.4.1.) they can watch a movie or football match (2.2.1., 2.2.3) , so they can choose (3.3.) from different lounges (3.1.1, 3.1.1.6.), what they need. Some of the crew, they just want to sit down quiet and just relax (2.1, 3.6.1.), before they go to bed and have a sleep(5.2.) (Participant 2, personal interview, May 18, 2021)

According to this analysis, it could be said that the daily routine of a seafarer is closely related with the 6 hour watch assigned to them, which could be taxing if the work is hard. Recreational zones in this sense become the zones visited after working hours, and before going to private cabins for sleeping. It can be said that seafarers need a degree of control and choice over which environments they would like to spend their leisure time in. The layout and furniture arrangement should be supportive of the functions these areas serve. Therefore, it is important that there are multiple lounges divided according to their functions with suitable indoor

environmental factors, for example a quiet lounge with minimal noise, or a TV room where a group of people can watch the same thing with appropriate seating.

From my point of view, where these rooms are located on the vessel, lounges (1.2.) on the ship side, you can make very nice areas (6.1.) where you can sit down and look out a little bit (3.4.2.), you have to look a little bit to size of the crew. On vessel D, there are 3-4 tables in the messroom which are round (3.2.1.1, 3.2.1.2), this is very good(6.1.). The mess room design and the buffet area of vessel D is excellent (6.1.), this is because of socialising of round table (3.2.1.1, 2.4.), there are enough space on each side of the tables so you can walk around them (3.1.1.1.), and especially now when you look upon the Covid-19 situation, you are not squeezing too many people too close (3.2.2.3., 3.5.1, 3.5.2.). And also the buffet area is open and spacious (3.1.), especially when you are looking at 15-16 people are eating at the same time (3.5.1., 5.2.) and finished with their meals they are taking their dishes into scullery (2.3., 5.2., indirect), then grab a cup of coffee and there is enough space around the catering area to do so. (2.3.1., 3.1.) (Participant 3, personal interview, May 31, 2021).

Positive expressions in this analysis focuses on the aesthetic pleasure lounges provide and the functionality of the mess room and serving area. Layout of the mess room and service area is reported as successful and the participant is very satisfied with it. Round tables are described as having a socializing effect and, table quantity and clear space around tables are associated with density and personal space on a positive note. An important note on daily routine is the observation that the seafarers after finishing their meals and leaving the dirty dishes for washing to another area, they come back to mess room for drinking coffee, and presumably for socializing, which is also noted by another participant:

The relation between the mess room and dayroom (3.1.1.2), I think is very important (6.1.), you know the crew come into mess room, they have the food serving (1.1., 2.3.) where there is food onboard, we have our own chef on board to make the food and the crew they need good food (2.3., 4.2. - indirect) and after finish eating they sit down in lounges for relaxing, have a cup of coffee, maybe some dessert (1.2., 2.3., 2.1.), sitting, talking together and they are relaxing very much in the lounges we have on board (1.2, 2.1., 2.4.1) (Participant 2, personal interview, May 18, 2021)

Participant 2 states that the distance between the two subspaces is important as in the daily routine, relaxing and socializing with a cup of coffee takes place after meals in the mess room. The distance between the two areas is positive in this statement as the observation tells that the crew members socialize in day rooms following the meal in mess rooms. Chatting as an activity is emphasized as opposed to watching TV in the previous statement by the same participant after the meal.

A precious point in this excerpt is the quality of food, and how the ship owner employs a dedicated chef to provide good food for the crew. It could be said that organizational choices can be affecting the crew members positively in the context of recreational zones and maybe more. However, some participants stated that due to their occupation onboard they are not able to spend as much time as other occupation groups in recreational zones or due to the nature of their work, they do not have much chance to interact with the rest of the crew, and that recreational zones are where they meet with the crew for a chat and socializing.

#### 5.3.1.1. Analysis of Interviews According to Functions and Activities

Analysis of interviews show that functions of rooms and activities held in rooms are closely interrelated. For instance, mess rooms are heavily associated with dining and chatting, whereas dayrooms and lounges are more associated with watching TV or

other forms of media. Watching TV is a major form of recreation in fishing vessels, whether it is for news, football matches or other forms of media. Dedicated lounges for watching TV, as well as quiet lounges without any TV are important to have, both to give options to occupants and also to prevent any negative indoor environmental factor to affect other seafarers in the same recreational zones.

Other forms of recreation apart from watching TV that are present on vessels is gaming consoles for seafarers, which could lessen boredom and enhance socializing in day rooms or TV/ Media Lounges. Some participants also reported a desire to see what was happening on deck while being in recreational zones, and one participant noted that they liked to watch the day's catch from the Camera System connected to TVs in day rooms. This could indicate a desire to connect with the outdoors and also a sense of achievement, by viewing the daily work on decks and factory areas.

Recreational zones were reported as social areas, and even though some areas were less preferred due to mostly environmental factors such as coldness or darkness, one participant noted that a decorative piece, in a way blocked seafarers from using one part of the recreational zone:

The least is the dayroom, the dayroom which is divided in two, there is a wall in the middle, a fireplace. Backend of that, nobody sits there, they just usually congregate around the mess and they move to quiet room or the first half of the dayroom (Participant 10, personal interview, July 10, 2021)

That lounge they can close the door, sitting much alone, also the temperature in that lounge is a little bit colder, we do not have the same temperature as the other lounges in that lounge, maybe because the floor heating is not turned on the right way, and also the ventilation from the inlet air comes a very cold air, so I can see the

crew is not using that lounge that much. (Participant 2, personal interview, May 18, 2021)

### 5.3.1.2. Analysis of Interviews According to Interior Design Characteristics

#### 5.3.1.2.1. Analysis of Interviews According to Layout

As the most effective theme throughout all of the interviews, layout and properties of layouts essentially shaped how the seafarers were using the recreational zones.

Vessels with multiple or divided recreational zones according to functions stated most positive about their satisfaction with recreational zones, whereas vessels with an insufficient degree of separation reported lowest, mostly because participants did not perceive that choice over where and how to spend their times. For instance, in one vessel, there are multiple zones with different functions and participants from this vessel state the quantity and functionality of separated areas is satisfactory, whereas in another, one participant is not satisfied with the degree of separation between mess room and day rooms, and how the transformation of the quiet lounge into a room with TV is now preventing him from using that area. The same participant also follows that the decorative fireplace which is full length to ceiling is mentally blocking the occupants to use the back half of the dayroom:

The least is the dayroom, the dayroom which is divided in two, there is a wall in the middle, a fireplace. Backend of that, nobody sits there, they just usually congregate around the mess and they move to quiet room or the first half of the dayroom. It is exactly the same on one side of the TV with sofa, you can not see each other, but it is I do not know, just that corner I do not use. Maybe because it is inside the room, it is further away (Participant 10, personal interview, July 10, 2021).

Some layouts were indeed perceived as more successful than the others, providing the seafarers with spacious places, ample seating areas and options to spend their



leisure time with, whereas some layouts presented little option for seafarers. As

Participant 1 has suggested:

I think the designers, then I am thinking about the designer of the total vessel, they should start to make more zones, not too open and only split with tables and sofas, but different zones so people, crew can stay a bit separated, not with the small rooms, but more open with some separation (Participant 1, personal interview, May 18, 2021).

Separated lounges with similar recreation options are mentioned to lead to grouping, which is not a desired outcome organization wise, whereas lounges divided by function tend to give the most satisfactory recreational environment to seafarers. This way quiet lounges are used for relaxing and detaching from the job's stress by means of soft fascination, whereas other lounges are used for socializing and talking with fellow crewmembers and a dedicated media room can be used for playing video games and watching TV, movies or sports events with crewmembers.

#### 5.3.1.2.2. Analysis of Interviews According to Sociopetal/ Sociofugal Qualities

Proxemics and personal space is also mentioned about the other recreational zones, with one participant stating how in one day room there are disagreements about who should sit on the single person recliners, which is both related to the amount of seats in the day room as well as the orientation of the seats and their degree of control over their personal spaces. Considering the limited spatiality of ships, both social and physical density of the recreational zones should be taken into account in design stage, so as to prevent negative social climate and provide a comfortable environment that is able to present flexible options to seafarers, such as quiet lounges for soft, silent relaxing and day rooms with different amenities for socializing and participating in activities as groups and individuals.

#### 5.3.1.2.3. Analysis of Interviews According to Indoor Environmental Factors

Participants described the indoor environmental factors such as lighting, ventilation and noise levels and associated these characteristics with positive expressions except for few localized areas where thermal comfort was compromised, and adjustment was unavailable. Noise, or rather the lack of it, was described as one of the positive aspects of the recreational zones, however due to layout properties, some participants reported that acoustic transference between subspaces when they are in use, is less than optimal and sometimes affected seafarers adversely:

A sliding door, or something to block the noise, because sometimes people are speaking too loudly. It is not the smell, it is the noise, the voice people, I do not know, people talk loudly sometimes.  
(Participant 10, personal interview, July 10, 2021)

Illumination and lighting were other important topics for participants of the interviews, and natural lighting's importance was emphasized, both due to the areas vessels are operating in, and also how natural light was affecting the recreational zones. It could be said that the placement of the recreational zones should be done in a way so that the use of natural light and visual accessibility towards nature is increased.

On a similar note, participants remarked on the importance of dimmable lighting as opposed to an on/off system. Adjustable lighting is also perceived and reported as a positive point for recreational zones, with one participant stating how useful scenario based lighting would be; for example when there is cleaning done in recreational

zones a brighter light could be used but for a relaxing scenario and subtle, dimmer lights could be used. Another participant stated how the light design in the mess room gives him an impression of being in a new place, and that they feel like waking up again. Lighting design of recreational zones could benefit from the natural environment vessels operate in, such as providing warmer colored lighting in long and dark winter months, and dimmer lights in long and light summer months in Northern seas.

#### 5.3.1.3. Analysis of Interviews According to Demographics & Daily Routines

The 6 hours on- 6 hours off watch system shapes the daily lives of seafarers and in a way creates the rhythm of the vessels, recreational zones are reported to be more in use during dinner times, with more social associations and for breakfast times as quieter. If a day of the seafarer is divided into 4 periods of 6 hours, 12 hours is spent in working zones, rest of the 12 hours is divided in between cabins, service areas for washing personal clothes and recreational zones. However, even though it is stated as 6 hours work- 6 hours rest for this system, the amount of time spent in zones is related to the occupational group a seafarer belongs in, such as engine personnel or navigational personnel not being able to use recreational zones as much as the fishers. Some interviewees said that they did not have enough time to spend in recreational zone:

The negative must be that I do not have so much time, everytime I am there, because my watch on the bridge is very busy, and to stay and keep working I can not join so much time in the mess room or dayroom. I have to go to my cabin to sleep and to relax before next watch. So that's a negative, I hope that I should have - normally could have - more time to relax in the area, because for me personally I relax a lot, joining, seeing TV, news. I can not go from watch only to eat and then to bed. That is not functional for me, I must relax for a

period in front of TV and clear my mind. (Participant 7, personal interview, June 7, 2021)

The positive that in the messroom you are eating and sharing a good meal with your crew workers and the same in lounges you relax a little bit, your mind is thinking a little bit differently, grabbing a cup of coffee and doing some time there before going to bed, and from my point of view this is a little bit important, because you are working quite hard, it could be like a skipper - mentally- or by a fishermen - physically-, and then when you are going into the messroom your mind is changing a little bit, and it gives you peace in order to fall asleep easily (Participant 3, personal interview, May 31, 2021).

Occupational differences and requirements are therefore effective in how a seafarers' daily routine happens, and their needs and demands from the same recreational zones in different contexts. A skipper might be in need of more restorative properties of mental type, whereas for a fisherman working in harsh outdoor environmental conditions, indoor environmental factors might be more important. The expressions of seafarers also change with their occupation on board; for instance a steward for one of the vessels, emphasized the ease of cleaning for interior surfaces, whereas a chief officer focused more on the restorative properties of recreational environments. Regardless, recreational zones are important for the well-being of seafarers in several different aspects.

#### 5.3.1.4. Analysis of Interviews According to Expressions

Majority of the participants described recreational zones in a positive light, expressing their satisfaction with aesthetic qualities and indoor environmental factors of recreational zones by using similes and metaphors likening recreational zones to hospitality and residential environments, and luxury passenger vessels. One participant stated how the interiors were becoming more modern and simple, with a

monochromatic palette rather than “yellow walls and red or blue couches” and others stating as “lovely” and “harmonic”. It has also been stated that the good feeling of being in recreational zones is associated with seasonal changes, with participants stating that in long and dark winter months, the recreational zones being more important:

...it is relaxing for them to go to this area to get positive energy, and positive energy especially in winter time - it is dark, a lot of bad weather, heavy seas- then you go from your small cabin to this area then you get inspiration to do a good job on board, and the captain need a crew that thinks positively... (Participant 1, personal interview, May 18, 2021)

As for the pleasantness evaluation, all interviewees reported that the recreational areas were pleasant areas in general, using words such as “like a hotel, like a cruise ship, like home, cosy, warm and light”. However some areas were defined as dark, gloomy and cold and in Vessel D in particular the dayroom and quiet lounge had conflicting views in between the interviewees, with one participant expressing the TV in former quiet lounge and its benefits, whereas the other expressed negative opinions on how the quiet lounge was not quiet anymore due to TV.

Many participants reported some expressions that could be associated with ART (Kaplan, 2001), with expressions such as “new energy”, “get away from job”, “disconnect from the work”. It is clear that recreational zones are helpful with transporting seafarers to a different mindscape, and this way allowing them to recover and restore their energy and attention levels. The properties that increase restorativeness for seafarers is a prospective research study, with one participant

stating positive expressions about sitting in the lounges and watching outside, a connection to nature can be further investigated:

The positive that in the messroom you are eating and sharing a good meal with your crew workers and the same in lounges you relax a little bit, your mind is thinking a little bit differently, grabbing a cup of coffee and doing some time there before going to bed, and from my point of view this is a little bit important, because you are working quite hard, it could be like a skipper - mentally or by a fishermen - physically, and then when you are going into the messroom your mind is changing a little bit, and it gives you peace in order to fall asleep easily (Participant 3, personal interview, May 31, 2021)

Positive effect, you can go there and don't think and just not think you are at work, you are at a break. Not home but almost home. (Participant 4, personal interview, May 28, 2021)

Generally, the dining areas are reported as successful. However, some participants noted that they felt as if they were sitting shoulder to shoulder with other crew members, and that a singular larger table could be more preferred. On the other hand, according to the reports on daily routines, existence of more than one table is the preferred way, as at least one is used by seafarers for eating and the other as more a social and talking area during the 6 hours off time of seafarers.

Serving areas' designs were similar for all 4 vessels, and the statements were positive for this type of serving areas, which consist of an island type serving counter, to which the users are able to reach from both sides. A sneezeguard which is a piece of acrylic or glass that protects served food from airborne particles has been mentioned both in the qualitative part of the Stage 1 and also in Stage 2.

### 5.3.2. Visual Summary of Findings

Following the detailed analysis of interviews, findings from the 2<sup>nd</sup> stage of the study were mapped according to the statements of the participants. For example, one participant stating a lounge to be used least because of lack of thermal comfort was shown on the map as a negative point, whereas another area which was reported as a social area was marked accordingly as a positive point. A summary of the positive and negative points in recreational zones are shown in Figures 36, 37 and 38 below:

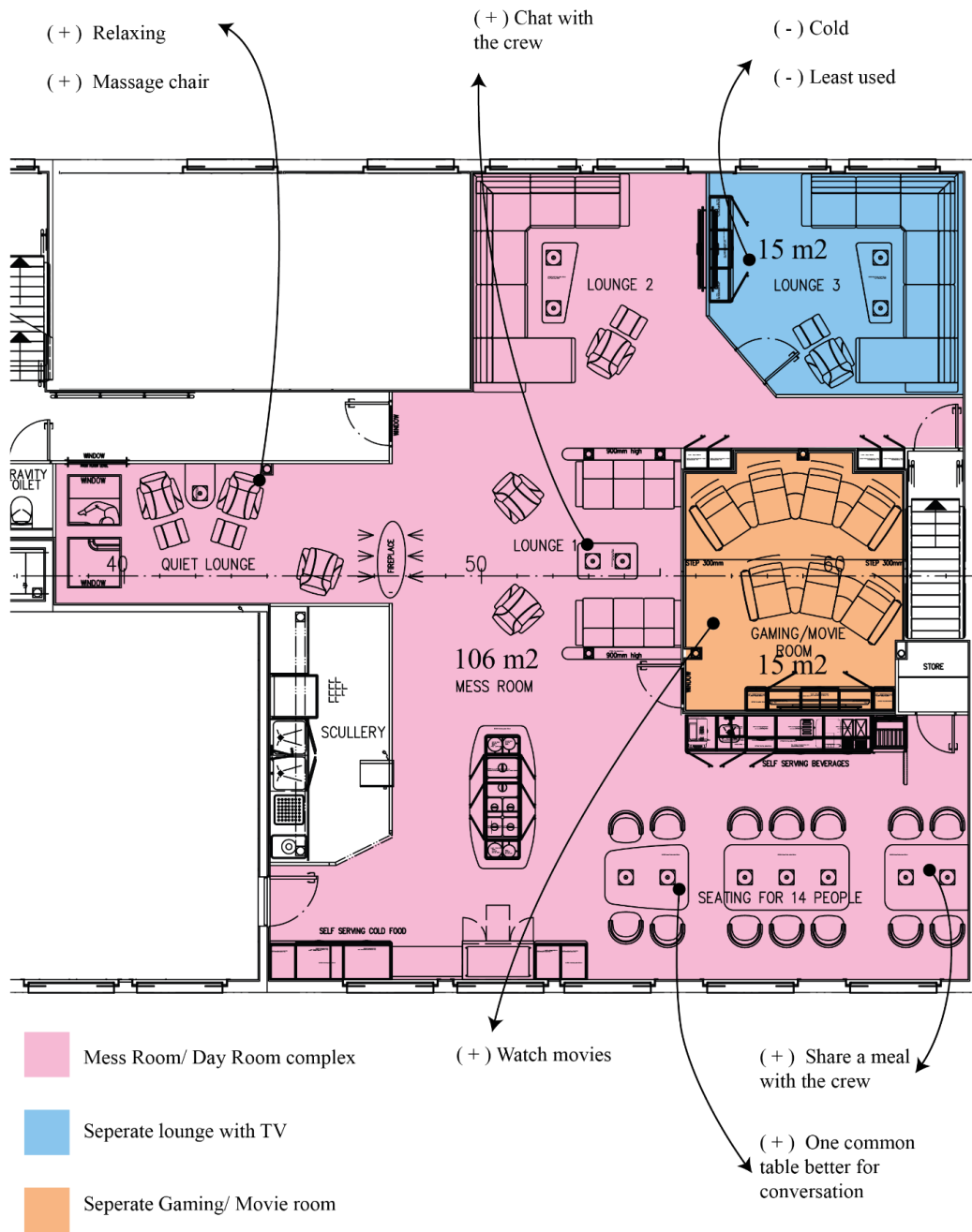


Figure 36. Summary of Vessel A, positive and negative expressions on functions and interior design characteristics



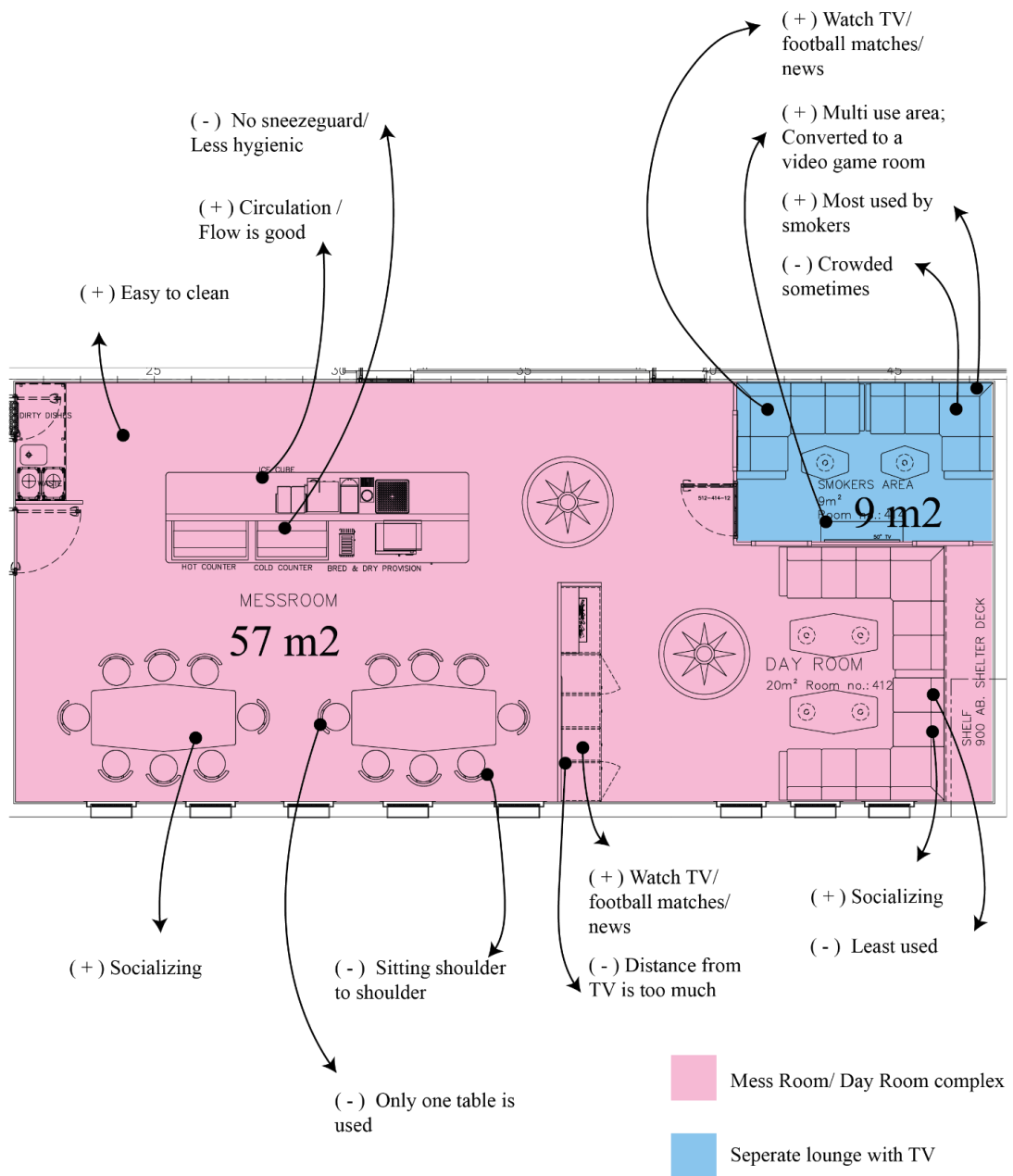


Figure 37. Summary of Vessels B&C, positive and negative expressions on functions and interior design characteristics

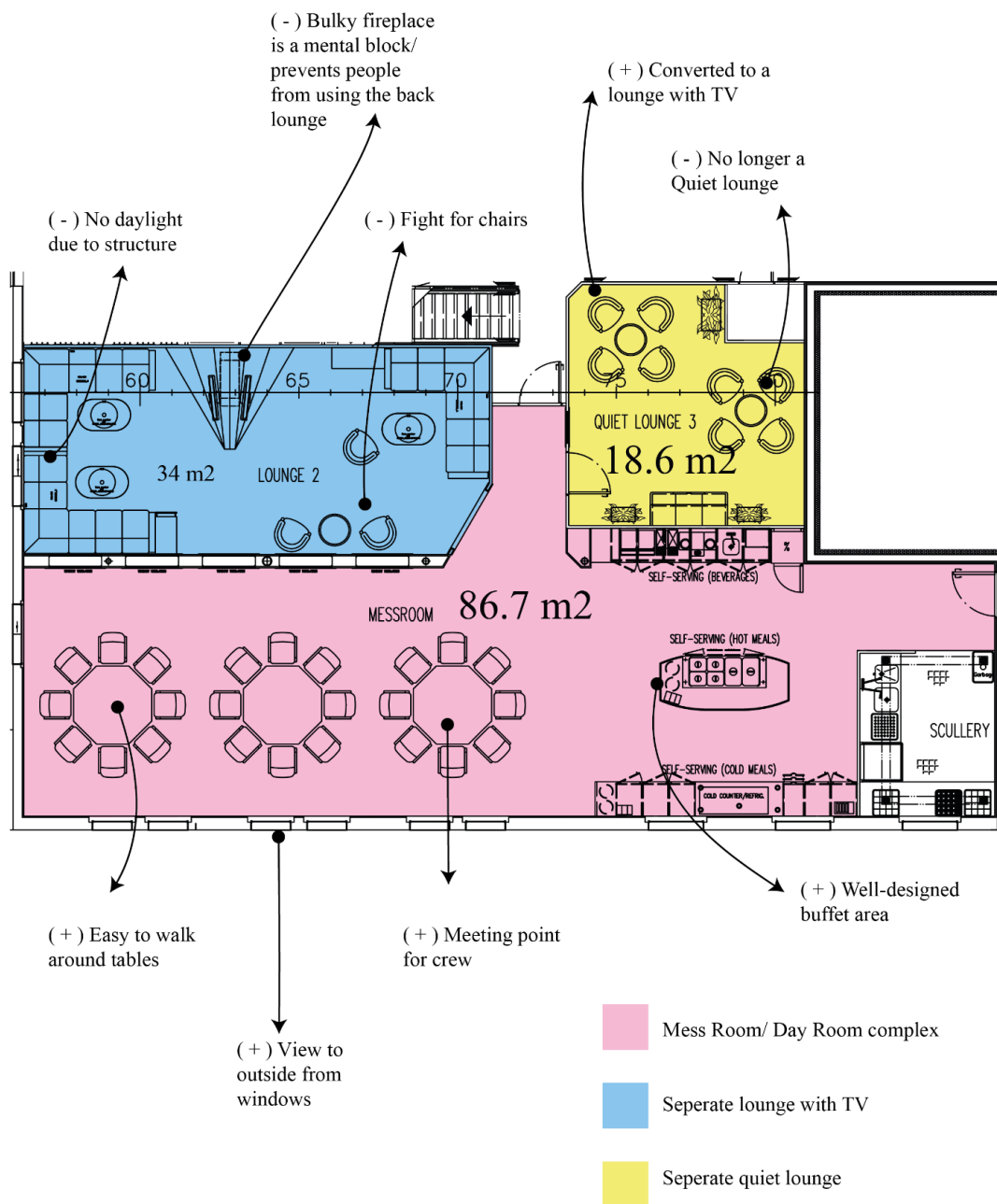


Figure 38. Summary of Vessels D, positive and negative expressions on functions and interior design characteristics

On a regular 12 hour period, it can be assumed that after 6 hours of working, a seafarer first visits the mess room for a meal, then spends some time relaxing and

socializing with their crewmembers in day rooms, either chatting, watching TV or participating in other activities such as playing cards before retiring to their cabins for sleeping or washing their personal laundry, after which the 6 hour working period starts again. Figure 39 demonstrates the circular flow of a 12 hour period in a seafarer's day:

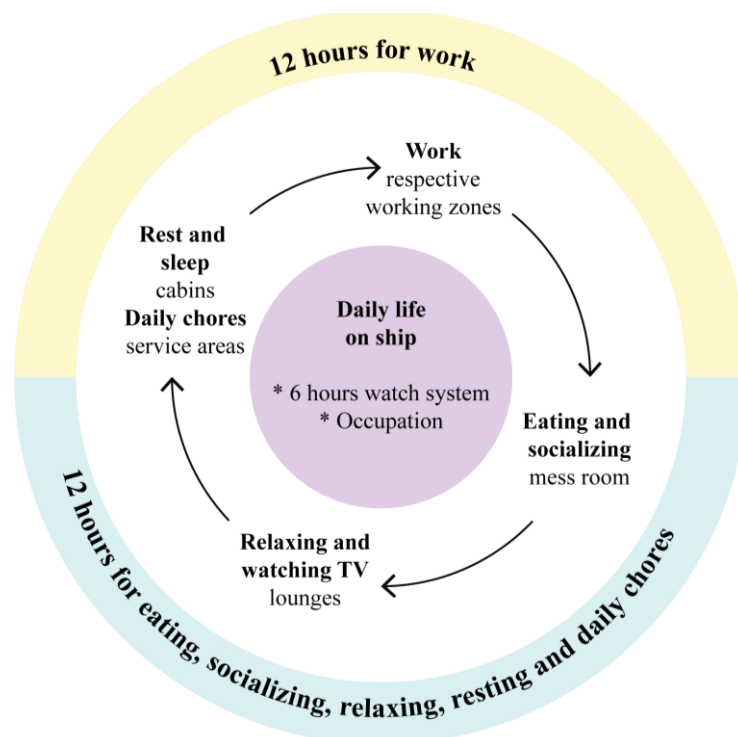


Figure 39. Circular flow of a 12 hour period in a seafarer's day.

Based on the analysis of the data gathered during the research, different interior design characteristics do affect the seafarers' satisfaction, however different methods might be necessary to understand how best to design the recreational zones according to the crew members of ships. A moderate and positive relationship has been found with the seafarers' evaluation of their respective recreational zones and well-being. A negative and negligible relationship has been found with the seafarers' evaluation of

their respective recreational zones and fatigue. Results are discussed in detail in the light of literature review in the following chapter.

## **CHAPTER 6**

### **DISCUSSION**

The strength of this research stems from having its roots in both quantitative and qualitative analysis. Quantitative analysis helped prove the relationship between three seemingly independent variables, and was advantageous in quantifying abstract concepts of evaluations of recreational zones, well-being and fatigue. Solely standing on the shoulders of quantitative analysis, a meaningful difference between interior design characteristics of the 3 designs of vessels have not been found, the satisfaction levels are generally high; however interviews and qualitative parts of the research gave rich and abundant information on how seafarers live on Norwegian fishing vessels, and their patterns of use while in recreational zones, their needs and opinions, both negative and positive.

It should be remarked that interviews provided more subtle points of seafarers' working conditions, daily habits, insights and experiential knowledge rather than the open ended questions in questionnaire. Layout and its effects on how indoor environmental factors are perceived were notable, and multiple day rooms divided according to functions were reported to be preferred by the participants. On the other hand, mess rooms and specifically dining tables were evaluated in terms of

proxemics, with a preference for multiple round tables or one big table with more space in between seats. This is in line with the literature review stating crowding and its effect on living and working in isolated environments (McCartan et al., 2014).

Based on the analysis of both stages of the study, it can be said that the interior design characteristics of recreational areas are influential on the well-being of seafarers, most notably on the subscale of hedonic well-being ( $r=0.530$ ,  $p<0.01$ ) compared with other subscales, however is also influential on general well-being, physical well-being and social well-being too. As well-being is important for seafarers' performance (Iversen, 2012), it could be said that ships' interiors should be designed by considering the seafarers' environmental satisfaction and evaluation criteria, and hedonic well-being is considered as the optimal psychological experience of an individual (Phillips et al., 2005). Measures to increase hedonic well-being could be followed in ships in addition to physical well-being.

On a positive note many interviewees reported positive expressions on the perception of recreational zones, using similes such as: like a cruise, like home, cosy, beautiful, new energy, warm and light. The evaluation of dining areas were positive in all vessels, with the expressions of dining area being a social place, and it could be said that several small tables could be preferred rather than one large table. Serving Area is another important element of the dining area, however this was similarly constructed in all vessels, with a serving island allowing for circulation of seafarers

around so it could not be discussed on the advantages or disadvantages of this design characteristic.

Even though the quantitative analysis did not show a direct relationship between interior design characteristics evaluation and fatigue ( $r=-0.217$ ,  $p>0.01$ ), some interviewees noted that they liked to spend time in recreational zones as it helps them unwind, and liked being there before going to sleep. Some of the remarkable points made by interviewees was the working hours and watch system that was common in all vessels that was interviewed for the purpose of this study. A 6 hour on, 6 hour off watch system was reported as part of the daily routine, with a sequence following each other of work, leisure and rest.

Comfort evaluations considering noise, air quality, thermal comfort, ergonomic comfort of the furnitures were not significantly different from each other, this could be explained as all the vessels were under Norwegian flag and built in a similar timeframe with each other, their structural properties and building regulations were similar, on top of that the used building materials had very similar properties, with polyvinyl chloride (PVC) covered steel and rockwool core sandwich panels forming walls, faux-wood luxury vinyl tiles for floors, RAL9010 colored steel ceiling panels, high pressure laminate (HPL) covered marine plywood furniture with design properties that meet the design requirements of seagoing vessels such as with rounded corners, floor mounted and swivel mechanism and for loose furniture the same brand and similar upholstery quality leather (Tersan Shipyard Archives).

One notable thing was the observation from two interviewees working on one vessel that one lounge was being used the least because of low temperature in the room, and that the Heating, Ventilation and Air Conditioning (HVAC) system in the vessel was not responding as it should to the users' needs. Thermal comfort could be an important factor in the design and implementation of recreational zones very much like office spaces (Kwon et al., 2019).

The correlation between fatigue and general satisfaction evaluation of recreational zones were negatively correlated; however the strength of the relationship was of weak, almost negligible level. This was expected, as sleep is the main activity that is influential in reducing fatigue (Vyazovskiy, 2015), and recreational zones are not exactly areas for sleeping, however interviews proved another point, that the recreational zones had a role in helping seafarers unwind before sleeping. All of the interviewees reported 6 hours on 6 hours off shifts, thus their sleep routines and relationship with how the recreational areas are used can be looked deeper into for alleviation of fatigue.



## **CHAPTER 7**

### **CONCLUSION**

In this study, the aim was to find whether or not interior design characteristics of recreational zones had effects on seafarers' evaluation of recreational zones, their well-being and fatigue. Based on the literature review, the evaluations of recreational zones in terms of interior design and seafarers' well-being were analyzed in a multi-method study, with results that could benefit the maritime industry in both design, new building and, repair and renovation sectors.

In light of the quantitative and qualitative analysis, it can be said that the different interior design characteristics do have an effect on the seafarers' well-being with their recreational environments on board their respective ships. Positive correlations of moderate strength were found with the general satisfaction levels of seafarers of recreational zones and different subscales of well-being; general well-being, physical well-being, social well-being and hedonic well-being.

Qualitative stage of the study provide subtler depictions on recreational zones than the quantitative did. Further qualitative methods could be utilized to understand the

factors affecting well-being onboard ships and specifically fishing vessels. Focus group studies, observations and maybe design workshops including end users could be applied for improved results. Mixed method studies can provide more accurate results, and bring into light the invisible aspects that are not mentioned or defined by participants.

Lack of privacy, crowdedness and sitting shoulder to shoulder was addressed by the participants in all 4 vessels and personal space, density and proxemics and how they affect seafarers could be a subject of research in the future, and the design of these areas could consider the spatial aspects and ergonomics in recreational zones as well.

Even though restorative characteristics were not defined in detail by seafarers, it is definite that one of the main functions of the recreational zones is providing a get-away from the daily stressors of working on a fishing vessel. All interviewees reported being able to detach from their working mindset while they were in the mess room and day rooms and one interviewee described it as new energy. It can thus be said that the restorative properties and what contributes to restorativeness of recreational zones in ships could be explored further.

Stakeholders' considerations on the sustainability of materials used in interiors of the vessel and their effects on well-being could also be the subject of another study.

McCartan et al. (2014) points to little visual distinction between recreational zones and work zones as an adverse factor, this could also be a point for ship designers to

keep in mind while designing a vessel and her interiors. Vessels using different materials and furniture types; and their differences can be researched so as to understand the contributing factors of well-being in a more tangible sense.

Some of the limitations that were experienced during this study was the fact that seafarers working in Norwegian fishing vessels are a very isolated and limited sample group. With a larger sample group more precise results could have been determined. The fact that there was limited internet onboard vessels also resulted in long waiting periods for interviews with some participants.

Upon exploring the unique situation of recreational zones in fishing vessels, it can be said that this research is valuable as it is one of the first studies held on a specific type of vessel focusing on the interior design characteristics with a crew of minimal national differences in between. This makes the research one that is able to explore how interior design characteristics affect individuals regardless of differences in nationality and vessel type. However, the author prepared questionnaire for this research could be developed and improved for more concise results, with more questions on different characteristics of vessels.

Ship designers, naval architects specializing in interior engineering, ship owners and environmental psychology researchers can benefit from this study by considering the points made by participants and the quantitative analysis of questionnaires to

increase well-being levels and decrease fatigue levels by the power of design in recreational zones. Habitability and human factors researchers can also research allowances for soft aspects of accommodation design in their studies as well as the hard ones that are specified in regulations and rules which support ship building process and seaworthy vessels.

Lastly, the potential of utilizing fishing vessels as analogues to extreme and isolated environments could be considered. The psychosocial factors influencing seafarers, and developments in ship habitability and human factors and their counterparts in even more severe extreme and isolated environments could be researched. Naval architects', seafarers' and marine human factors engineers' experiences can be translated across other transportation and extreme and isolated environments studies.

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## **APPENDICES**

- A. ETHICS COMMITTEE APPROVAL FORM
- B. QUESTIONNAIRE FORM FOR STAGE 1 (IN ENGLISH)
- C. INTERVIEW FORM FOR STAGE 2 (IN ENGLISH)
- D. STATISTICAL ANALYSES

## APPENDIX A. ETHICS COMMITTEE APPROVAL FORM



**Bilkent Üniversitesi**  
Akademik İşler Rektör Yardımcılığı

**Tarih** : 22 Şubat 2021  
**Gönderilen** : Ezgi Koşar  
**Tez Danışmanı** : Burçak Altay  
**Gönderen** : H. Altay Güvenir  
İnsan Araştırmaları Etik Kurulu Başkanı  
**Konu** : "Effect of ..." çalışması etik kurul onayı



Üniversitemiz İnsan Araştırmaları Etik Kurulu, 22 Şubat 2021 tarihli görüşme sonucu, "Effect of Recreational Zones' Interior design on the Well-being of Seafarers in Fishing Vessels" isimli çalışmanız kapsamında yapmayı önerdiğiniz etkinlik için etik onay vermiş bulunmaktadır. Onay, ekte verilmiş olan çalışma önerisi, çalışma yürütücileri ve bilgilendirme formu için geçerlidir.

Bu onay, yapmayı önerdiğiniz çalışmanın genel bilim etiği açısından bir değerlendirmedir. Çalışmanızda, kurumumuzun değerlendirmesi dışında kalabilen özel etik ve yasal sınırlamalara uymakla ayrıca yükümlüünüz.

Kovid-19 salgını nedeniyle konulmuş olan kısıtlamaların yürürlükte olduğu süre içinde, tüm komite toplantıları elektronik ortamda yapılmaktadır; aşağıda isimleri bulunan Bilkent Üniversitesi Etik Kurulu Üyeleri adına bu yazıyı imzalama yetkisi kurul başkanındadır.

Etik Kurul Üyeleri:

Ünvan / İsim	Bölüm / Uzmanlık	
Prof.Dr. H. Altay Güvenir	Bilgisayar Mühendisliği	Başkan
Prof.Dr. Erdal Onar	Hukuk	Üye
Prof.Dr. Haldun Özaktaş	Elektrik ve Elektronik Müh.	Üye
Doç.Dr. Işık Yuluğ	Moleküler Biyoloji ve Genetik	Üye
Dr. Öğr. Çyesi Bureu Aysen Ürgen	Psikoloji	Üye
Doç.Dr. Çiğdem Gündüz Demir	Bilgisayar Mühendisliği	Yedek Üye
Dr. Öğr. Çyesi A.Barış Özbilen	Hukuk	Yedek Üye

Kurul karar/toplantı No: 2021\_02\_22\_02

## APPENDIX B. QUESTIONNAIRE FORM FOR STAGE 1 (IN ENGLISH)

### Effect of Recreational Zones' interior design on the Well-being of seafarers in Fishing Vessels

Recreational zones in vessels are social and communal spaces where crewmates can spend time when they are not working. Mess Rooms, Day Rooms, Quiet Lounges and Media Rooms as well as Gyms and Saunas are the kinds of recreational zones that can be found in ships. The following questions are designated to measure the effect of recreational areas on the general well-being of seafarers. Please answer the questions regarding your experiences on board including only the time you spend in these places for leisure.

This survey aims to receive data from your valuable input as seafarers as you experience your residential and recreational environment in everyday life. The answers will be collected anonymously by the system. Information participants supply during the study may be used as feedback to improve the design of vessels and also be published for academic purposes. However, the participants' responses will remain confidential. The survey consists of 50 questions and take approximately 15 minutes to finish.

We do not foresee any risks or discomfort from your participation in the survey. Participation to the study is on a voluntary basis and you have the choice not to participate. Your identity will remain anonymous; your choice will not have an impact on any relationship to the investigator (Ezgi Koşar) and will not affect the research outcome.

You may contact with Ezgi Koşar ([ezgi.kosar@bilkent.edu.tr](mailto:ezgi.kosar@bilkent.edu.tr)) for any further questions.

\* Required

1. I agree to participate in the research study. I understand the purpose and nature of this study and I am participating voluntarily. I understand that I can withdraw from the study at any time, without any penalty or consequences. I grant permission for the data generated from this research to be used in the researcher's publications on this topic. \*

Mark only one oval.

- Yes Skip to question 2  
 No Skip to question 50

Tell us about yourself

The first section of this questionnaire consists of demographic questions such as age, sex and occupation. All answers will be kept anonymous and no data will be shared with a third party.

2. What is your age?

\_\_\_\_\_

3. What is your sex?

Mark only one oval.

- Female  
 Male  
 Prefer not to say  
 Other: \_\_\_\_\_

4. What is your nationality?

\_\_\_\_\_

Daily life on board

The following questions are designated to measure place attachment, frequency and purpose of usage for recreational zones in vessel.

5. What is the amount of time you spend daily in the following zones of the ship? \*

Mark only one oval per row.

	0-2 hours	2-4 hours	4-6 hours	6-8 hours	8 hours or more	I do not know	Do not want to answer
Working zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreational zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cabin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. How long have you been working in a ship?

\_\_\_\_\_

7. How long has it been since you last went on a shore leave?

Mark only one oval.

- A few days
- A week
- A few weeks
- A few months

8. What is your occupation?

Mark only one oval.

- Navigation officer
- Operational personnel
- Fisher / Fish Factory Personnel
- Technical Personnel
- Other: \_\_\_\_\_

9. What type of fishing vessel are you working on?

Mark only one oval.

- Trawler  
 Longliner  
 Danish Seiner  
 Other: \_\_\_\_\_

10. What are the activities you partake in recreational zones daily?

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**Evaluation of  
Recreational Zones**

Please answer the questions regarding your experiences on board including only the time you spend in these places for leisure.

11. The following part consists of statement with a linear scale of agreeableness, for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I am satisfied with the layout of Recreational Zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the amount of time I spend in Recreational Zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel relaxed when I am in recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I feel mentally renewed when I am in recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel rested when I am in recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think the recreational rooms are socially pleasant places	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I think the recreational rooms are spacious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are enough seating units in the recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to converse easily in recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I think the recreational rooms provide a comfortable environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can get away from daily stressors in recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to reflect on my thoughts when I am using recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I am satisfied with the illumination level in recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the ventilation in recreation rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the air quality in recreation rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I am satisfied with the noise levels in recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the dining table arrangement in Mess Room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the serving area arrangement in Mess Room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I am satisfied with the aesthetic quality of recreational rooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can easily use the Self-Serving Area in Mess Room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the amount of distance between myself and other crewmates seated at the table	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I am satisfied with the amount of TVs in Day Room.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am pleased with the recreation options in social spaces.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the amount of TVs in Day Room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	6 I do not know	7 Not applicable
I am satisfied with the placement of TVs in Day Room.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think the recreational rooms are physically pleasant places	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel positive about the recreational zones.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



20. Overall, what are your opinions on Recreational Zones?

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21. Overall what do you think can be improved about Recreational Zones in vessels?

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Well-Being  
Scale

Please answer the questions regarding your experience on board the vessel you are working on. This scale is designated to measure subjective well-being.

22. The following part consists of statement with a linear scale of agreeableness. for instance if you strongly agree with a statement please select the strongly agree option from the table.

Mark only one oval per row.

	Strongly disagree	Moderately disagree	Mildly disagree	Mildly agree	Moderately agree	Strongly agree
I am physically healthy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have enough financial resources to meet my needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have enough financial resources to have fun.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with my housing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel in control of my finances.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel in control over my physical health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with my weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have enough energy to do the things I need to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take good care of my physical health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan for the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have someone who knows me well to talk to when I have problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know I can count on my friends and/or family in a time of crisis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is at least one person I know who loves me and/or needs me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident that I am able to solve most problems I face.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like my life at home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with my physical appearance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get along with people in general.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy spending time with friends and/or relatives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find time to do things that are fun and interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe I have the potential to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

reach my goals.

I believe that I can make a difference in the lives of others.

Life has meaning for me.

I am satisfied with my spirituality.

I think I am as smart as, or smarter than, others.

I often do things that bring out my creative side.

I like engaging in stimulating conversations.

I try to do things that make me happy.

I feel happy often.

I enjoy life.

Piper  
Fatigue  
Scale

Many individuals can experience a sense of unusual or excessive tiredness whenever there are stress sources in life. This unusual sense of tiredness is not usually relieved by either a good night's sleep or by rest. Some call this symptom "fatigue" to distinguish it from the usual sense of tiredness. Seafarers may experience fatigue due to many factors some of which are environmental stressors, motion at sea, loneliness and so on.

For each of the following questions, please fill in the space provided for that response that best describes the fatigue you are experiencing now or for today. Please make every effort to answer each question to the best of your ability.

23. How long have you been feeling fatigue?

Mark only one oval.

- not feeling fatigue
- minutes
- hours
- days
- week
- months
- Other: \_\_\_\_\_

24. To what degree is the fatigue you are feeling now causing you distress?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10

No Distress             A Great Deal

25. To what degree is the fatigue you are feeling now interfering with your ability to complete your work activities?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10

None            A Great Deal

26. To what degree is the fatigue you are feeling now interfering with your ability to visit or socialize with your friends?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10

None            A Great Deal

27. To what degree is the fatigue you are feeling now interfering with your ability to engage in sexual activity?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10

None            A Great Deal

28. Overall, how much is the fatigue which you are now experiencing interfering with your ability to engage in the kind of activities you enjoy doing?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10

None            A Great Deal

29. How would you describe the degree of intensity or severity of the fatigue which you are experiencing now?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10  
Mild            Severe

30. To what degree would you describe the fatigue which you are experiencing now as being?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10  
Pleasant            Unpleasant

31. To what degree would you describe the fatigue which you are experiencing now as being?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10  
Agreeable            Disagreeable

32. To what degree would you describe the fatigue which you are experiencing now as being?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10  
Protective            Destructive

33. To what degree would you describe the fatigue which you are experiencing now as being?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10  
Positive            Negative

34. To what degree would you describe the fatigue which you are experiencing now as being?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Normal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Abnormal

35. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Weak

36. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Awake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Sleepy

37. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Lively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Listless

38. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Refreshed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Tired

39. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Energetic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unenergetic

40. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Patient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Impatient

41. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Relaxed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Tense

42. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Exhilarated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Depressed

43. To what degree are you feeling now?

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Able to Concentrate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unable to Concentrate

44. To what degree are you feeling now?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10

Able to Remember             Unable to Remember

45. To what degree are you feeling now?

Mark only one oval.

0 1 2 3 4 5 6 7 8 9 10

Able to think clearly             Unable to think clearly

46. Overall, what do you believe is most directly contributing to or causing your fatigue?

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47. Overall, the best thing you have found to relieve your fatigue is:

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48. Is there anything else you would like to add that would describe your fatigue better to us?

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49. Are you experiencing any other symptoms right now?

Check all that apply.

No

Yes (if yes please describe in "other" option down below)

Other:  \_\_\_\_\_

Thank  
you!

Thank you for participating in my research. If you have any suggestions and comments please contact me at: [ezgi.kosar@bilkent.edu.tr](mailto:ezgi.kosar@bilkent.edu.tr)

With my best regards  
Ezgi Kaşar  
Graduate student at I.D. Bilkent University

50. If you would like to participate further in this study in the form of one on one interviews or group discussions, please write your e-mail below and you will be contacted by the researcher as soon as possible.

\_\_\_\_\_

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## APPENDIX C. INTERVIEW FORM FOR STAGE 2 (IN ENGLISH)

21.08.2021

Interview

### Interview

Recreational zones in vessels are social and communal spaces where crewmates can spend time when they are not working. Mess Rooms, Day Rooms, Quiet Lounges and Media Rooms as well as Gyms and Saunas are the kinds of recreational zones that can be found in ships. The following interview questions are designated to measure the effect of recreational areas on the general well-being of seafarers. Please answer the questions regarding your experiences on board including only the time you spend in these places for leisure.

This interview aims to receive data from your valuable input as seafarers as you experience your residential and recreational environment in everyday life. The interview will be held on Zoom (online conferencing platform) at the selected time of the participants and the answers will be collected by the researcher during the online meeting. Information participants supply during the study may be used as feedback to improve the design of vessels and also be published for academic purposes. The participants' responses will be recorded for detailed analysis and will be transcribed in the analysis process, the answers will be anonymized during data analysis process. The interview consists of 13 questions and is expected to last 45 minutes.

We do not foresee any risks or discomfort from your participation in the survey. Participation to the study is on a voluntary basis and you have the choice not to participate. Your identity will remain anonymous; your choice will not have an impact on any relationship to the investigator (Ezgi Koşar) and will not affect the research outcome.

You may contact with Ezgi Koşar ([ezgi.kosar@bilkent.edu.tr](mailto:ezgi.kosar@bilkent.edu.tr)) for any further questions.

\* Required

1. INFORMED CONSENT: I agree to participate in the research study. I understand the purpose and nature of this study and I am participating voluntarily. I understand that I can withdraw from the study at any time, without any penalty or consequences. I grant permission for the data generated from this research to be used in the researcher's publications on this topic. I grant permission for the interview to be recorded by the researcher. \*

Mark only one oval.

- Yes Skip to question 2  
 No

Demographics

2. Age

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3. Gender

Mark only one oval.

- Male
- Female
- Prefer not to say
- Other: \_\_\_\_\_

4. Nationality

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5. Occupation on board

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Interview  
Questions

This part of the Interview will be held on Zoom or another online video call platform.

6. What do you think about the relationship between the Mess Rooms and Day rooms in ships and the well-being of seafarers?

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- 7. What have you noticed about the way recreational zones are used in your vessel during lunch and/or dinner time? How does the way these areas are used change with the hours?

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- 8. When you are using the Mess Rooms and Dayrooms, where are your favorite areas to be in? Why?

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- 9. When you are using the Mess Rooms and Dayrooms, where are your favorite areas to be in? Why?

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- 10. Which areas in Mess Rooms and Dayrooms are being used the least? What are your experiences and observations?

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- 11. What are your experiences on the interior design of these recreational zones - Mess Rooms and Dayrooms- and how does the design in these rooms affect your experience?

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- 12. What do you think could be improved about the interior design of these recreational zones, namely Mess Rooms and Day Rooms?

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- 13. What are the most negative and positive aspects of the time you spend in Mess Rooms and Day Rooms?

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- 14. What do you think of the relationship between a sense of community and the design of Mess Rooms and Day rooms?

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21.08.2021

Interview

Thank  
you

Thank you for participating in this study!

You may contact with Ezgi Koşar ([ezgi.kosar@bilkent.edu.tr](mailto:ezgi.kosar@bilkent.edu.tr)) for any further questions.

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## APPENDIX D. STATISTICAL ANALYSES

Table 12. Summary of demographics

### DEMOGRAPHICS

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender (n=34)	Male	31	91.2	91.2	9.2
	Female	2	5.9	5.9	97.1
	Prefer not to say	1	2.9	2.9	100.0
Grouped Age (years) (n=33)	18-29	7	20.6	21.2	21.2
	30-39	13	38.2	39.4	60.6
	40-49	6	17.6	18.2	78.8
	50-59	6	17.6	18.2	97.0
	60-69	1	2.9	3.0	100.0
Nationality (n=34)	Norwegian	32	94.1	94.1	94.1
	Danish	2	5.9	5.9	100.0
Occupation on board (n=33)	Navigation Officer	10	29.4	30.3	30.3
	Operational personnel	1	2.9	3.0	33.3
	Fisher/Fish factory personnel	16	47.1	48.5	81.8

Table 12 (cont'd)

	Technical Personnel	4	11.8	12.1	93,9
	Steward	2	5.9	6.1	100,0
<hr/>					
Grouped work experience (years) (n=34)	0-10	13	38.2	38.2	38.2
	11-20	11	32.4	32.4	70.6
	21-30	4	11.8	11.8	82.4
	31-40	4	11.8	11.8	94.1
	41-50	2	5.9	5.9	100.0
<hr/>					
Type of fishing vessel being worked in (n=34)	Trawler	4	11.8	11.8	11.8
	Longliner	26	76.5	76.5	88.2
	Danish Seiner	3	8.8	8.8	97.1
	Other	1	2.9	2.9	100.0
<hr/>					



Table 13. Summary of the amount of time spent in zones by seafarers

**AMOUNT OF TIME SPENT IN SHIP ZONES**

		Frequency	Percent	Valid Percent	Cumulative Percent
Working Zones (n=34)	4-6 hours	5	14.7	14.7	14.7
	6-8 hours	7	20.6	20.6	35.3
	8 hours or more	22	64.7	64.7	100.0
Recreational Zones (n=33)	0-2 hours	12	35.3	36.4	36.4
	2-4 hours	17	50.0	51.5	87.9
	4-6 hours	2	5.9	6.1	93.9
	6-8 hours	1	2.9	3.0	97.0
	8 hours or more	1	2.9	3.0	100.0
Cabins (n=34)	0-2 hours	1	2.9	2.9	2.9
	2-4 hours	1	2.9	2.9	5.9
	4-6 hours	6	17.6	17.6	23.5
	6-8 hours	15	44.1	44.1	67.6
	8 hours or more	11	32.4	32.4	100.0

Table 14. Mean ranks between vessels and their evaluations of subscales from the evaluation of recreational zones.

<b>Mean Ranks</b>			
	Vessel Code	N	Mean Rank
General Evaluation of Recreational Zones	A	19	19.66
	B&C	11	15.59
	D	4	12.50
	Total	34	
Layout Evaluation of Recreational Zones	A	19	19.58
	B&C	11	16.05
	D	4	11.63
	Total	34	
Restorativeness Evaluation of Recreational Zones	A	19	18.47
	B&C	11	17.45
	D	4	13.00
	Total	34	
Indoor Environmental Factors Evaluation of Recreational Zones	A	19	17.05
	B&C	11	17,95
	D	4	18.38
	Total	34	
Pleasantness Evaluation of Recreational Zones	A	19	19.00
	B&C	11	16.27
	D	4	13.75
	Total	34	

Table 15. Non-Parametric Anova (Kruskall-Wallis) between vessels and their evaluations of subscales from the evaluation of recreational zones.

<b>Test Statistics<sup>a,b</sup></b>					
	General Evaluation of Recreational Zones	Layout Evaluation of Recreational Zones	Restorativeness Evaluation of Recreational Zones	Indoor Environmental Factors Evaluation of Recreational Zones	Pleasantness Evaluation of Recreational Zones
Chi-Square	2.315	2.511	1.023	.096	1.237
df	2	2	2	2	2
Asymp. Sig.	.314	.285	.600	.953	.539
a. Kruskal Wallis Test					
b. Grouping Variable: Vessel Code					

Table 16. Bivariate correlation between General well-being and General evaluation of recreational zones

		<b>Correlations</b>		
			General Evaluation of General Well-being	Recreational Zones
Spearman's rho	General Well-being	Correlation Coefficient	1,000	.560**
		Sig. (2-tailed)	.	.001
		N	34	34
	General Evaluation of Recreational Zones	Correlation Coefficient	.560**	1,000
		Sig. (2-tailed)	.001	.
		N	34	34

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

Table 17. Bivariate correlation between Physical well-being and General evaluation of recreational zones

<b>Correlations</b>				
			Physical Well- being	General Evaluation of Recreational Zones
Spearman's rho	Physical Well- being	Correlation	1.000	.504**
		Coefficient		
		Sig. (2-tailed)	.	.002
		N	34	34
	General Evaluation of Recreational Zones	Correlation	.504**	1.000
		Coefficient		
		Sig. (2-tailed)	.002	.
		N	34	34

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

Table 18. Bivariate correlation between Social well-being and General evaluation of recreational zones

<b>Correlations</b>				
			Social Well-being	General Evaluation of Recreational Zones
Spearman's rho	Social Well-being	Correlation Coefficient	1,000	.464**
		Sig. (2-tailed)	.	.006
		N	34	34
	General Evaluation of Recreational Zones	Correlation Coefficient	.464**	1.000
		Sig. (2-tailed)	.006	.
		N	34	34

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

Table 19. Bivariate correlation between Hedonic well-being and General evaluation of recreational zones

<b>Correlations</b>				
			Hedonic Well- being	General Evaluation of Recreational Zones
Spearman's rho	Hedonic Well- being	Correlation	1,000	.530**
		Coefficient		
		Sig. (2-tailed)		.001
		N	34	34
	General Evaluation of Recreational Zones	Correlation	.530**	1.000
		Coefficient		
		Sig. (2-tailed)	.001	
		N	34	34

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

Table 20. Bivariate correlation between Fatigue and General evaluation of recreational zones.

<b>Correlations</b>			General Evaluation of Recreational Zones	
			Fatigue	
Spearman's rho	General Evaluation of Recreational Zones	Correlation	1.000	-.217
		Coefficient		
		Sig. (2-tailed)	.	.219
		N	34	34
	Fatigue	Correlation	-.217	1.000
		Coefficient		
		Sig. (2-tailed)	.219	
		N	34	34