
EXPERIMENT 1

0 Min.	Time:	Activity	Communication
Initiation	12:20	Navigator starting commands in initiate the start of the tour. Assistant and Helmsman gives back feed through repeating.	Verbal
	12:21	HM no more talking; Assistant provides coordinates	Verbal
Turning	12:24	Silence, accept the Navigator	Verbal
5 Min. Setting course (Orientation)	12:25	Navigator steps for, look at monitor , several times	Non-Verbal
		Assistant talks to Navigator	Verbal
		Assistant looks mostly on the map Navigator steps for, look at monitor , talking to HM	Verbal
		Assistant looks outside , talks to Navigator	Verbal
		Assistant points on the monitor	Non-Verbal
		-> Navigator steps for to look at monitor , steps back to look into OBN	
		Navigator steps for, look at monitor .	Non-Verbal
10. Min (setting course)	~12:30	Navigator talks about position (?), Assistant provides new coordinates for the course	Verbal
15. Min (critical phase)	12:35	Navigator talks to Assistant . Misunderstanding - Assistant turns head around	Verbal (Non-Verbal)
	12:37	Assistant talks, no feedback	Verbal
	12:39	(A or N) Misunderstanding - repeats coordinates	Verbal
20. Min		Assistant checks Navigator's activity - looking back	(Non-Verbal)
	12:44	Navigator steps for, look at monitor - asks Assistant for information. Assistant sometimes used some time for answer .	Verbal

EXPERIMENT 2

0 Min.	Time:	Activity	Communication
Initiation	13:53	Navigator starting commands in initiate the start of the tour.	Verbal
	13:55	Assistant and Helmsman gives back feed through repeating.	
		Navigator mainly talking ; Assistant looks at monitor	Verbal
	13:57	Assistant looks back to the Navigator . Needs Feedback?	(Non-Verbal)
5 Min. Turning and Setting course	13:58	Assistant talks loader to Navigator Navigator repeats coordinates	Verbal
	13:59:55	Assistant talks loader to Navigator Navigator repeats coordinates, again Navigator commands helmsman, DAG	Verbal
setting course	14:02	Navigator set OBN, DAG	Verbal
10. Min (setting course)	14:04	S.O(N?) is distracted - outside	
	~14:04	Assistant gives hand-signs . Assistant talks, hand signs probl. not seen.	Non-Verbal Verbal
	14:05	Navigator said something. Assistant turned around to check	Verbal Non-Verbal
	14:06	Assistant gives hand-signs .	Non-Verbal
15. Min Turning		Assistant tries to say something. Navigators talks first	Verbal
	14:09	Navigator looks to the right side. Repeats and Assistant also looks . Assistant talks and looks to the same direction.	Verbal
	14:09:50	Assistant points on the screen. Assistant looks around Navigator comes to the front	Non-Verbal
		Navigator asks something - Assistant "yap" Navigator asks something - Assistant replies -> Navigator comes to front, check monitor	Verbal

EXPERIMENT 2

	Time:	Activity	Communication
20. Min		Navigator looks at Helmsman screen	none?
	14:14	Assistant points finger up. No reaction. Navigator talks to Helmsman	Non-Verbal
		Assistant gives new coordinates to Navigator Assistant makes hand sign(left Hand) Navigator probably not seen	Verbal Non-Verbal
	14:16	(JA) Navigator looks at ship in environment Assistant looks on ship in monitor Assistant points to final destination	Non-Verbal
END(~14:18)	14:18:30	Assistant looks back to Navigator to provide information verbally	Verbal/ Non-Verbal

Debrief

Frode: communication gets more, when there is no joint attention

Tim: communication gets more when workload is higher

1)Question: Assistant made some hand gestures during the exercise, has the Navigator seen and understood those?

Answer: I don't look at that, what the Assistant points at. We normally know through verbal communication the exact position. We confirm every coordinate through the repetition (words and number)

EXPERIMENT 3

Briefing	Time:	Activity	Communication
Briefing	08:15	Navigator and Assistant talking not very quiet together to set the system for the route	Verbal
		Navigator shows Assistant the risky? and dangerous position during the route on the map by pointing with the finger on the map. Helmsman also agrees.	Non-Verbal
0 Min.			
Initiation	08:23	Navigator initiate route by looking into OBN . Gives first commands and steps to front to check the monitor of Assistant. -> Assistant no response -> cannot speak -> then can -> Turn head around -> Navigator goes front -> Assistant: "Ah ok"	Verbal (non-verbal)
setting course	08:25	Navigator accepts course by "set" and "yep"; still checks front	Verbal
		Assistant very quite voice, Navigator rises voice, Assistant asks with little more loader voice (rising voice action)	Verbal
	08:27	Assistant looks on monitor (map) while confirming to the Navigator .	Verbal
5. Min	--		
Turning		Bridge (Everyone) talks loader	Verbal
	08:30	Navigator overtakes the command After setting - Assistant response	
	08:31	Assistant looks at the monitor Navigator looks outside environment (JVA?)	None
	08:32	Assistant is not sure(?) Navigator goes front (no pointing, verbally)	Verbal
	08:32:40	Assistant turns around to see Navigator. meaning?	Non-Verbal
		Assistant starts a new route(?) repeating and check coord.	Verbal
10. Min	~08:33	Bridge talks less - silence during the turn	None
Turning			

EXPERIMENT 3

	Time:	Activity	Communication
		Assistant looks around and looks to the Navigator . Assistant wants confirmation for the next steps? Assistant tries Eye-contact.	Non-Verbal
		Assistant look at the monitor and talks about the new route. Navigator checks the outside environment. Confirms next steps. (JA)	Verbal
Turning	08:37	Assistant and Navigator look both outside. Navigator initiate the turning phase. (JVA)	None / Verbal
		Assistant set new course after turning phase. Navigator confirms and talks to Helmsman .	Verbal
15. Minutes	08:39	Assistant provides new coordinates for the new route. Helmsman steers. Assistant looks out to check environment. Does Assistant always check it? HM does as said	Verbal
	08:41	Navigator goes front . Assistant asks about new route . Navigator steps to front and talks to the Assistant . Then goes back	Verbal
		Navigator sees the container ship asks if it is seeable?	Verbal
20. Minutes (Turning?)		Generell more talking (Navigator talks more then Assistant) Helmsman also gets more involved into the actions	Verbal
		Crossing by the container ship. Assistant and Navigator look outside (dangerous situation)	None
		Navigator more talking to Helmsman	Verbal
		General Bridge gets quite (after more complicated situation.) Assistant takes over talking , ship passes by - Assistant looks outside again (JV?)	
END(~08:48)		Assistant left completely eyes from the monitor close to the end of the route	

EXPERIMENT 3

Debrief

1) Do you know each other

A) Participants know each other (also the other ones later confirmed to know each other)

2) Why step to the front

A) Discuss dangerous situation. Not necessary for confirmation.

3) Are we as researcher stress you as a participant

A) not the people stress, the situation with the given speed and limitations are stressing

4) When all candidates on the bridge talk - who is the main person in charge ?

A) Navigator is always first person

5) Sometimes you look away from the monitor to look at the Navigator. When is that?

A) Assistant tries to understand what the Navigator is doing. So he can prepare for next steps.

6) The signs with the hands, do they have a meaning (Navigator?)

A) Hands used as a habit

Tim Notes

Assistant looks always out when something is happening (dangerous situation). Also talks more than usual.

Assistant and Navigator talks louder in important situation

-> Voice rises in turning / important phases / or when workload gets higher.

EXPERIMENT 4

	Time:	Activity	Communication
Briefing	09:00	Navigator looking to the Helmsman and continues to make the settings for the route on the monitor for the assistant . Both are going through the route. During that the navigator points out things. Assistant seems to tell what's good? Assistant makes adjustments -> Navigator talks last time to the helmsman.	Verbal Non-Verbal
0 Min. Initiation	09:20	Navigator starts simulation with loud voice: "klar!"; "start!" The Assistant is very quiet at that point. Navigator also talks to the Helmsman and answers "det ar god", Navigator talks most	Verbal
Planning Route		Assistant provides new coordinates for preparing the turn. The Navigator repeats all verbal commands. "det ar god!"	Verbal
	09:25	The Navigator points out something important on the monitor . Navigator talks mainly.	Non-Verbal Verbal
5 Min. Turning		Assistant just talks when changing the course. The Bridge talks all at the same time. Assistant stops first talking.	Verbal
Setting course	09:27	Assistant accidentally gave coordinates for the next turn already. Mistake. "beklage!" -> "yep" by Navigator (more "yep" and "der ar god")	Verbal
(Orientation)	09:29	Assistant looks outside for dangerous situation. Assistant wants to say something -> Navigator does not Assistant talk . Assistant looks around- While they passing the ship Bridge is quiet.	Verbal None
10. Min (setting course)	09:31	Navigator talks with Assistant about new coordinates for the course. Sometimes quieter .	Verbal
Tuning		Assistant looks out into the environment during the turn. Assistant starts talking to Navigator. Both look on the monitor. (JVA?)	Verbal

EXPERIMENT 4

	Time:	Activity	Communication
Tuning	09:34	Still turning and very quiet. Approaching the curve, Navigator looks back and sets the clock.	None
(setting course) 15 Min.		Assistant provides new coordinates to set the new course. Navigator repeats and "det ar god" Navigator stands back with hands in the pocket Navigator steps a bit for to the Assistant (being closer). Answers Helmsman " get ar god"	Verbal Verbal
(Tuning ?)		Approaching new situation . Assistant talks more but the Navigator often interrupts the Assistant. Does not accept what Assistant says.	Verbal
Turning		Navigator repeating commands from Assistant. Afterwards Assistant looks around while approaching next curve. Assistant looks outside. (JV?) -> Chaos	Verbal
20 Min.	09:40	Small boat crosses by - Navigator talks mostly	Verbal
		Navigator uses the change of his voice to tell that he has not understood.	Verbal
	09:44	Assistant accidentally gave coordinates for the next turn already. Mistake. "Jeg beklage!" – "Jeg beklage!"	Verbal
End (~09:45)		Assistant looks around- While they passing the end of the route, gets quiet .	Verbal
		Debrief 1) Is the navigators voice always first? A) stops everyone, in critical situations its needed. 2) Why are you saying "det ar god"? A)This is a standard according to the guide for communication - > normally directed towards the HM 3) Ass. when do you look outside the window? A) When want to prepare next steps for the navigator	

EXPERIMENT 5

	Time:	Activity	Communication
Briefing	10:00	Navigator shows and points at the route. Also the Navigator overtakes the instruments , commands on it and tells what might be difficult.	Verbal Non-Verbal
0 Min. Initiation	10:15	Navigator checks all systems, also checks the Helmsman system.	Verbal
Planning Route	10:16	Assistant has a question. The Navigator steps for in front of the monitor to the right of the Assistant. Assistant shows something on the map.	Non-Verbal
		The Navigator steps back again , behind the Assistant. The navigator continuously checks all the instruments and monitors. <i>// not much talking almost no communication</i>	None
5 Min.		Assistant gives numbers and coordinates, which get repeated. Navigator also checks Helmsman: "det ar god"	Verbal
	10:21	Assistant can't say much. The Navigator steps for and the Assistant points something out on the screen. In total the Navigator double checks the instruments and monitor a lot. Also during the Assistant gives the new coordinates the Navigator still walks around and checks the monitor.	Non-Verbal Verbal
		Navigator goes to the Assistant and takes over the most talking. The Navigator talks mainly - the Assistant does not talk much. The Navigator steps back afterwards to the OBN	Verbal
	10:24	The Navigator asks for information. The Assistant answers rot the Navigator. Still the Navigator checks the information on the monitor, before he steps back to the OBN	Verbal
	10:25	Assistant looks on the map, Navigator looks outside : (JA)	None
	10:26	Quiet situation on bridge. Navigator repeats a few things and Assistant answers by "Yep"	Verbal

EXPERIMENT 5

	Time:	Activity	Communication
10. Min Tuning	10:26	Assistant points with the pointer/courser on the next Objects. (Not sure if Navigator sees it)	Non-Verbal
(setting course)	10:28	Navigator talks mostly. Assistant and the Navigaots check the route together on the monitor. "Det ar good" to the Helmsman. Assistant gives the new coordinates to the Navigator. Navigator repeats.	Verbal
Turning		Navigator looks left and right side of the bridge after received the new coordinates and initialize the turn. After the turn he looks into the back window.	Verbal
15 Min. (setting course)		Assistant gives new coordinates. After the turn, Assistant and Navigator discussing new dangerous objects on the route. Therefore Navigator stops for to check the monitor. Navigator and Assistant look at the same thing, But Navigator looks outside and Assistant looks on monitor (JA)	Verbal
	10:33	While Assistant is talking Navigator is looking on the screen. " det ar good" to Assistant. (JVA)	Verbal
20 Min. (Turning)		Assistant points out with finger on the monitor, Navigators agrees possible, and steps for to the monitor. Assistant gives new coordinates to the Navigator.	Non-Verbal
		Navigator looks again on the monitor to make sure about the situation.	None
		Navigator looks around (seems like the ship stoped)	
		Navigator seems a bit nervous Navigator points something on the monitor map. Navigator decides to stay close next top the assistant.	Non-Verbal
		The Assistant is not talking much. Navigator points out thing on the monitor. It looks like he is overtaking the Assistants situation.	Non-Verbal
End (~10:40)	10:40	The Navigator goes to the map and talks to the Assist (JV)	Verbal

EXPERIMENT 5

Debrief

1) Why does the navigator often steps next to the Assistant ?

- A) Just for self orientation, to get an better overview of the situation. sometimes better to check the monitor of helmsman (binoculars) , before using the OBS
- B) simulator is also limited in the view
- C) Night and real situation is much better
- D) but not too much difference!

2) Why are you saying “det ar god”?

- A) This is a standard according to the guide for communication -
> normally directed towards the HM

3) Ass. when do you look outside the window?

- A) When want to prepare next steps for the navigator
-

EXPERIMENT 6

// Both standing and both navigators

	Time:	Activity	Communication
Briefing	12:15	Assistant shows and points at the route. (using finger)	Verbal Non-Verbal
0 Min. Initiation	12:25	Navigator is initializing, stands in the back and gives commands to the Helmsman -> "det ar god"	Verbal
		Assistant says something - But gets interrupted. "det ar good" very often	Verbal
Planning Route	12:29	Navigator says "yap" and "set" very often Assistant and Navigator planning route- many repeating	Verbal
5 Min. (Turn?)	12:31	Assistant does not look much outside. Assistant seems unsure, Navigator steps for to the monitor.	None
		Assistant checks the environment and inside bridge -> says something	Verbal
	12:33	Assistant becomes quiet now and gets no response be the navigator.	Verbal
10 Min. (Turn?)	12:34	Navigator asks Assistant if they are on the right track! gets a positive response. They are using the finger to point at it.	Verbal Non-Verbal
		The Assistant looks outside now quite a lot. The Assistant informs the Navigator about the new situation. Passing - > "det ar god"	Verbal
Planning Route		Imitate/ set new route. Assistant looks outside afterwards	Verbal
Turn		During the turn , the Assistant checks environment and bridge, then provides new information to the Navigator. The Navigator talked to the Helmsman in the meanwhile.	None Verbal

EXPERIMENT 6

Tuning	Time: 12:37	Assistant reminds Navigator for the new dangerous situation (Truning)	Communication Verbal
	12:38	Both look outside (environment) at the same dangerous coast rocks (JVA)	None
	12:39	Assistant could not understand navigators and turns head	Non-Verbal
15 Min. (setting course)		Assistant provides new coordinates/numbers for the Navigator. Navigator is using the watch and talking to the Helmsman	Verbal
		Assistant checks outside environment, while the Navigator is looking at the OBN	None
	12:42	The Navigator has a question towards the Assistant. Navigator steps for to confirm the question, Assistant gets more quiet now	Verbal
Turning		Assistant reminds new turn on the monitor. The Navigator steps for to look at the monitor. Assistant looks outside the environment for the situation to check double	Verbal
	12:44	“stop” -> small ship surprises the crew	Verbal
20 Min.		Assistant provides new coordinates and also checks outside. From now on Assistant looks much more outside the environment.	Verbal
	12:47	Assistant makes more decisions. Assistant looks also outside to see the ship passing by	Verbal
		Navigator steps back and gives new instructions. “yap” to all coordinates the assistant provides.	Verbal
		Navigator just agrees to most things by the assistant says by “yap”. Assistant looks back for the confirmation.	Verbal

EXPERIMENT 6

Debrief

In the beginning the navigator asked the assistant(actual Navigator) that in difficult situation more crew members should look outside. The Navigator asked therefore for an active assistance.

**When the Navigator steps for and looks at the monitor, normally he had to say that he looks down.
"look down"**

Naturally both Navigator and Assistant let the helmsmen look outside as they can try to figure out the dangerous situation.

**What is the difference between "yap" and "det ar god" ?
both has the same meaning - but "Det ar god" is official**

EXPERIMENT 7

// Both standing and both navigators

	Time:	Activity	Communication
Briefing	13:22	//	
0 Min. Initiation	13:22	Navigator and Assistant look outside the environment, then both look to the monitor (JVA) - then they create new coordinates	Verbal
Planning Route	13:25	Navigator steps back to look outside environment. After giving new coordinates, Assistant also looks outside.	Verbal
5 Min. (Turn?)	13:27	Assistant looks outside environment and talks to the navigator.	Verbal
	13:29	Assistant asks something at the monitor - points to it on the monitor.	Non-Verbal
	13:30	For the turn, the Navigator steps for to the monitor to talk to the assistant for the new route	Verbal
10 Min. (Turn?)		Assistant looks outside the Environment. Assistant and Navigator cooperate.	Verbal
		Navigator starts controlling - Voice gets loader	Verbal
Planning Route	13:31	Navigator steps to the helmsman to see the binoculars and get better information. Than goes to Assistant to set a new Coordinate	Verbal
	13:33	Assistant points out to the projection to show something in the environment. (JV)	Non-Verbal
Turn		The Navigator steps to the front next to the Assistant, they start turning.	None
		During the turn, Assistant and Navigator look booth outside the environment.	None

EXPERIMENT 7

	Time:		Communication
Tuning	13:36	The Assistant points with the hand to his monitor. (JV)	Non-Verbal
15 Min. (setting course)		The Navigator asks again, raises the voice. Navigator gives commands to the helmsman.	Verbal
	13:39	Assistant give new coordinates and looks outside the environment for next dangerous objects.	Verbal
(Turning?)	13:40	Assistant shows something dangerous on the monitor. Navigator recognizes it and walks over to the monitor	Non-Verbal
		Everyone looks outside the environment. Navigator steps over to the Helmsman.(All look outside)	None
20 Min.		Assistant points map on monitor to make a new route. Assistant looks outside the environment.	Non-Verbal
		Ship appears. Assistant points at the ship with finger.	Non-Verbal
		Container ship appears. Assistant looks outside the environment -> back to the monitor -> asks the Navigator (possible sequence)	Verbal
		Assistant looks now only down to the monitor. (maybe he does hand-signs?)	
	13:46	Assistant first points on the map of the monitor then outside. The Navigator understands this gesture.	Non-Verbal
		Assistant points with finger on the next container ship. Navigator checks the Helmsman	Non-Verbal
		Navigator points at something to the helmsman	Non-Verbal
		Assistant points outside the environment again on the next ship and shows him information with the finger on the monitor.	Non-Verbal
		Everyone looks outside the environment -> finished	

EXPERIMENT 7

Debrief

Why Assistant pointing so much outside?

Navigator: This helps me a lot, and can be faster than verbal communication. In most cases it helps to lower also the workload for me. But might be also the opposite when information is not relevant for me at that point. Then I also have to see what I need. Wrong information can happen when the "red ten" is different from his angle than mine.
(Assistant comes from another area, where they got taught to point at things.

Navigator goes to the front to check the binuclear

EXPERIMENT 8

// Both standing and both navigators

	Time:	Activity	Communication
Briefing	14:22	Casual talks pointing on different parts of the monitor. Assistant is using the instruments and the Navigator points on parts of the route by finger.	
0 Min. Initiation		Navigator starts by checking both monitors (assistants route and helmsman binucual) Navigator stands between both.	
Planning Route	14:25	Assistant starts commands towards Navigator. Seems like the Navigator interrupts the Assistants with a question.	Verbal
5 Min. Turn		Assistant gives coordinates - then start turning.	Verbal
		Assistant and Navigator look outside environment. Assistant points out something.	Non-Verbal
		// Quiet	None
		After the turn - Assistant provides new coordinates (very standard)	Verbal
Planning Route		Standard repetition by all participants. The Assistant is a bit quiet. Just the Navigator gives commands.	Verbal
	13:31	The Navigator steps for to the monitor to talk to the Assistant for the new route. The Navigator listen and repeats a lot what the Assistant provides. (no pointing)	Verbal
10 Min. (Turn?)		//not much talking Assistant looks at Navigator too received attention?	Non-Verbal
(Planning?)		Navigator needs coordinates-> steps to the front to the Assistant. Assistant shows something on monitor.,	Non-Verbal?
		Assistant gives many commands and the Navigator simply agrees.(?)	Verbal

EXPERIMENT 8

(Tuning?)	Time: 14:36	Navigator asks something the Assistant. Navigator tries to make Eye-contact(?)Assistant does notice it?	Communication Non-Verbal Verbal
		Assistant shows Navigator dangerous things on the map . Navigator asks Assistant -> gets "yes" as a response	Non-Verbal Verbal
15 Min. (setting course)	14:39	The Navigator repeatedly says "yap" as a response. Navigator asks something the Assistant. Navigator looks outside then checks the monitor.	Verbal
		Assistant seldom looks outside	
(Turning?)	14:41	Navigator asks Assistant -> Assistant moves head slightly towards Navigator Assistant just looked shortly outside, even a more difficult situation appears (JA)	Non-Verbal Verbal
		Navigator and Assistant looked on the monitor (JV)	
20 Min.		Navigator -> Assistant is a lot more arranging and repeating the OBN	Verbal
		Ship appears - Everyone/ Bridge is looking outside . Assistant says anything.	None
	14:45	Navigator talks most of the time. A short misunderstanding	Verbal
		Container ship arrives. The Assistant shows something outside.	Non-Verbal
	14:47	Assistant looks at the monitor and Navigator outside the environment. (JA)	None
		Assistant looks shortly outside the environment. => Finish	

EXPERIMENT 8

Debrief

Does the Navigator notice when the Assistant looks

The Navigator normally does not focus on the Assistant - normally just focus on the work.