Participant	Group	Experience UML	Experience ER	Experience Partial Models	Profession or Degree/Year	Specialization
1	1	4		1	MScA.C / 1	AAC
2	2	4		1	phd / 1	SE
3	3	3		2	phd / 3	Data Warehouses & BI
4	4	2		1	phd / 2	SE
5	1	2	2	1	Researcher	SE
6	2	4	5	4	Researcher	SE
7	3	3	3	4	Software Developer	SE
8	4	5		5	Research Programmer	SE, Modelling Tools
9	1	2	1	1	Software Developer	HCI
10	2	4	4	2	MSc	SE
11	3	4	2	2	phd / 3	SE
12	4	3	3	2	phd	SE
AVG		3.3333333333	2.857142857	2.16666666666		
Pilot1	1	3		2	phd / 1	HCI

Times

		Free Form			Annotation Read			Annotation Write			Graphical Read			Graphical Write					
Participant	Group	Start	End	Time	Start	End	Time	Start	End	Time	Start	End	Time	Start	End	Time			
1	1	11:48:00	11:59:00	0:11:00	12:00:00	12:14:00	0:14:00	12:15:00	12:28:00	0:13:00	12:35:00	12:48:00	0:13:00	12:49:00	13:05:00	0:16:00			
2	2	10:46:00	10:55:00	0:09:00	17:15:00	17:30:00	0:15:00	17:30:00	17:35:00	0:05:00	11:03:00	11:18:00	0:15:00	17:08:00	17:15:00	0:07:00			
3	3	10:16:00	10:18:00	0:02:00	10:36:00	10:50:00	0:14:00	10:51:00	10:56:00	0:05:00	10:21:00	10:29:00	0:08:00	10:31:00	10:34:00	0:03:00			
4	4			0	10:18:00	10:32:00	0:14:00	10:32:00	10:41:00	0:09:00	10:41:00	10:51:00	0:10:00			0			
5	1	11:49:00	11:58:30	0:09:30	12:01:00	12:18:30	0:17:30	12:19:00	12:30:30	0:11:30	12:32:00	12:40:00	0:08:00	12:44:00	12:55:00	0:11:00			
6	2	11:48:00	11:55:00	0:07:00	12:25:00	12:38:53	0:13:53	12:39:20	12:45:47	0:06:27	11:59:40	12:11:36	0:11:56	12:11:50	12:23:16	0:11:26			
7	3	11:48:40	11:54:01	0:05:21	12:20:45	12:30:12	0:09:27	12:31:09	12:41:02	0:09:53	11:56:41	12:09:50	0:13:09	12:10:12	12:18:49	0:08:37			
8	4	11:48:45	11:57:40	0:08:55	12:00:45	12:23:59	0:23:14	12:24:10	12:32:14	0:08:04	12:34:00	12:52:34	0:18:34	12:53:20	12:59:30	0:06:10			
9	1	12:40:00	12:44:00	0:04:00	12:51:00	13:08:00	0:17:00	1:14:00	1:25:00	0:11:00	6:15:00	6:19:00	0:04:00	6:26:00	6:35:00	0:09:00			
10	2	12:39:00	12:43:00	0:04:00	13:13:00	13:27:00	0:14:00	2:22:00	2:30:00	0:08:00	12:47:00	13:00:00	0:13:00	13:01:00	13:12:00	0:11:00			
11	3	11:58:00	12:03:00	0:05:00	12:32:00	12:38:00	0:06:00	12:38:00	12:46:00	0:08:00	12:04:00	12:16:00	0:12:00	12:16:00	12:30:00	0:14:00			
12	4	11:48:59	11:53:59	0:05:00	12:02:11	12:13:25	0:11:14	12:15:00	12:34:01	0:19:01	12:40:20	12:57:20	0:17:00	12:57:41	13:07:11	0:09:30			
AVERAGE				0:06:26			0:14:06			0:09:29			0:11:58			0:09:42		0:51:42	
Pilot	4	2:26:00	2:29:00	0:03:00	2:32:00	2:52:00	0:20:00	2:52:00	3:05:00	0:13:00	3:07:00	3:18:00	0:11:00	3:21:00	3:29:00	0:08:00			

		SET											VAR										MAY										MAY GROUPINGS										Overall	
		Und.	Intuitive		Easy Remember		Efficient Reading		Efficient Writing		Preference		Und.	Intuitive		Easy Remember		Efficient Reading		Efficient Writing		Preference		Und.	Intuitive		Easy Remember		Efficient Reading		Efficient Writing		Preference		Und.	Intuitive		Easy Remembe		Efficient Reading		Efficient Writing		Preference		Preference	
Participant	Group		Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr		Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr		Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr		Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr	Ann	Gr
1	1	3	3	4	3	4	3	4	3	4		1	3	3	4	3	4	3	4	3	4		1	3	3	4	3	4	3	4	3	4		1	3	2	4	2	4	2	4	2	3		1		1
2	2	4	4	4	4	5	3	4	3	3		1	4	4	5	4	5	3	4	3	3		1	5	4	3	4	4	4	2	4	2	1		5	5	3	5	4	5	2	5	2	1			
3	3	4	4	5	4	5	3	4	5	3		1	3	2	5	2	5	3	4	4	2		1	5	4	4	4	4	4	3	4	3	1		4	3	5	4	4	4	3	5	3				1
4	4	3	3	3	2	2	2	4	4	4		1	3	2	2	2	2	4	4	4	4		1	3	4	2	4	2	4	4	4	4		1	3	2	2	2	2	4	4	4	4		1		1
5	1	4	2	4	1	4	1	3	1	2		1	3	2	1	2	3	2	3	2	2		1	3	1	4	1	3	1	2	1	4		1	1	1	4	1	4	1	2	1	3		1		1
6	2	5	3	5	4	5	4	5	4	5		1	4	3	2	3	3	4	4	4	4	1		5	2	5	3	5	2	4	2	4		1	5	2	5	3	5	2	4	2	4		1		1
7	3	4	4	4	4	4	4	4	4	3	1		4	4	3	4	4	4	4	4	2	1		5	5	4	5	4	4	5	4	3	1		4	4	3	4	3	3	3	4	4	1		1	
8	4	5	3	5	5	5	4	5	4	5		1	5	3	4	5	4	4	4	4	4		1	5	3	5	5	5	4	5	4	5		1	5	2	4	2	4	2	5	4	3		1		1
9	1	5	5	5	5	5	5	5	5	5		1	4	2	5	2	5	3	5	3	5		1	4	2	5	2	5	3	5	3	5		1	4	4	4	4	4	3	4	4	3		1		1
10	2	5	1	5	3	5	3	5	4	5		1	3	1	4	3	5	3	5	5	4		1	5	1	4	4	5	1	5	1	5		1	5	1	4	4	5	1	5	1	5		1		1
11	3	4	4	4	2	4	4	4	4	2		1	2	2	2	2	2	4	2	4	2			4	4	4	4	4	4	4	4	4			4	4	2	4	2	2	2	4	2	1		1	
12	4	3	2	2	2	2	4	4	2	2			3	2	2	2	2	2	2	2	2			4	2	2	4	4	4	4	4	2	1		3	3	4	3	4	2	4	3	3		1		
AVG/TOTAl		4.1	3.2	4.2	3.3	4.2	3.3	4.3	3.6	3.6	1.0	10.0	3.4	2.5	3.3	2.8	3.7	3.3	3.8	3.5	3.2	2.0	8.0	4.3	2.9	3.8	3.6	4.1	3.2	3.9	3.2	3.8	4.0	7.0	3.8	2.8	3.7	3.2	3.8	2.6	3.5	3.3	3.3	3.0	8.0	2.0	8.0
Pilot1	1		3	4	2	3	2	3	3	4		1		3	5	2	5	2	5	4	4		1		3	4	4	5	2	5	4	4		1		3	4	4	5	2	4	4	3		1		1

ReadingAccuracy

		ANNOTATIONS													GRAPHICAL												
		Var				Abs				May					Var				Abs				May				
Participant	Group	Did they id PoUs correctly?	Did they correctly id the uncertainties behind the PoUs?	Did they draw correct concretizations?	TOTAL	Did they id PoUs correctly?	Did they correctly id the uncertainties behind the PoUs?	Did they draw correct concretizations?	TOTAL	Did they id PoUs correctly?	Did they correctly id the uncertainties behind the PoUs?	Did they draw correct concretizations?	TOTAL	Total per person	Did they id PoUs correctly?	Did they correctly id the uncertainties behind the PoUs?	Did they draw correct concretizations?	TOTAL	Did they id PoUs correctly?	Did they correctly id the uncertainties behind the PoUs?	Did they draw correct concretizations?	TOTAL	Did they id PoUs correctly?	Did they correctly id the uncertainties behind the PoUs?	Did they draw correct concretizations?	TOTAL	
1	1	2	0	0	2	2	0	0	2	0	0	0	0	4	2	0	0	2	2	0	0	2	1	1	1	3	7
2	2	2	1	0	3	2	2	2	6	1	1	1	3	12	2	1	2	5	2	2	1	5	2	2	2	6	16
3	3	2	1	2	5	2	1	2	5	2	2	1	5	15	2	2	2	6	2	2	2	6	2	2	1	5	17
4	4	2	0	0	2	2	1	2	5	1	0	0	1	8	2	0	0	2	2	2	2	6	1	1	1	3	11
5	1	1	0	0	1	1	2	0	3	1	0	0	1	5	2	0	0	2	2	2	0	4	1	1	1	3	9
6	2	2	1	2	5	2	2	2	6	2	0	0	2	13	2	1	2	5	2	2	2	6	2	1	1	4	15
7	3	2	2	2	6	2	2	2	6	1	2	2	5	17	2	1	2	5	2	2	2	6	2	1	1	4	15
8	4	2	2	2	6	2	2	2	6	2	2	2	6	18	2	2	2	6	2	2	2	6	2	2	2	6	18
9	1	2	2	2	6	2	2	2	6	1	1	1	3	15	2	0	2	4	2	0	2	4	2	2	2	6	14
10	2	2	2	2	6	2	2	2	6	1	1	1	3	15	2	0	0	2	2	2	2	6	2	1	1	4	12
11	3	2	1	2	5	2	2	2	6	2	1	1	4	15	2	2	2	6	2	2	2	6	1	1	1	3	15
12	4	0	0	0	0	1	2	1	4	1	0	0	1	5	2	0	0	2	2	1	2	5	2	0	1	3	10
TOTAL		21	12	14	**47**	22	20	19	**61**	15	10	9	**34**	142	24	9	14	**47**	24	19	19	**62**	20	15	15	**50**	159
AVG					3.9				5.1				2.8	11.8				3.9				5.1666				4.2	13.3
Pilot		2	1	0	3	2	1	0	3	2	1	1	4		2	2	2	6	2	2	2	6	2	1	1	4	
Each cell is:												**Grand Total:**	**142**												**Grand Total:**	**159**	
2: yes																							significant diff for may				
0: no																							same for var and abs	indicate scale			
1: so/so																											

ERROR COUNTS		WRITING WITH ANNOTATIONS					WRITING WITH GRAPHICAL SYNTAX								
Participant	Group	**EA1**	**EA2**	**EA3**	**TOTAL**	**#Comprehension Errors**	**EG1**	**EG2**	**EG3**	**EG4**	**EG5**	**EG6**	**EG7**	**TOTAL**	**#Comprehension Errors**
1	1	2	0	1	3	7	1	2	1	0	0	0	0	4	6
2	2	0	0	0	0	0	2	0	0	1	1	0	0	4	3
3	3	0	0	1	1	0	2	0	0	0	0	0	0	2	0
4	4	1	2	0	3	3	2	0	1	0	1	0	1	5	1
5	1	2	3	1	6	1	0	0	0	0	1	1	0	2	2
6	2	0	0	0	0	1	0	0	0	0	0	1	1	2	1
7	3	0	0	0	0	0	0	0	0	0	1	1	0	2	0
8	4	0	0	0	0	2	0	0	0	0	0	0	0	0	0
9	1	0	0	0	0	0	1	0	0	0	0	0	0	1	1
10	2	Used the graphical syntax instead (flawlessly!)				0	2	0		0	0	0	1	3	1
11	3	2	4	0	6	2	2	0	0	0	1	0	1	4	0
12	4	6	3	0	9	4	2	1	0	0	1	2	1	7	5
TOTAL		13	12	3	**28**	**20**	14	3	2	1	6	5	5	**36**	**20**
AVG					2.3	1.7								3.0	1.7
without outliers					16	9								21	7
Pilot		0	0	1	1	3	0	0	0	0	1	1	0	2	1
			Errors that have to do with May Formula:	15							Errors that have to do with May Formula:	16			
List of Errors:															
Annotations		Graphical													
EA1	Missing Annotation	EG1	No different colors for different PoU											same # compreh. errors	ann: comp errors due to may formula reading
EA2	Missing Variables	EG2	No/incorrect cloud icon											more errors in graphical for writing	14 out of 36 errors are from color coding for vis	1.16666666666667
EA3	Syntactically wrong May formula	EG3	No stacked double line for Set edges												errors attributable to may groupings end up similar
		EG4	Incorrect annotation of attributes (contained elements)												
		EG5	Incorrect use of dots												
		EG6	Incorrect enumeration of alternatives												
		EG7	Incorrect use of minifeatures												

Free Form		
p1 - dashed lines for all uncertainty		
p2 - red colour for all uncertainty, annotated [ptOfUncert#, alternative#]	*	
p3 - green colour and circled all uncertainties		
p4 - used ? (and n? for set)		
p5 - comment-heavy	*	
p6 - "no way to express this complex vocabulary in a graphical model..."	*	
p7 - MAVO		
p8 - MAVO, with red colour code for (M) and (S) and green with "Mergeable" for Var		
p9 - dashed lines for may and groupings; ? as icon; pile for set	*	
p10 - * used to annotate var; '...' for set		
p11 - 'M' and 'alt' annotations		
p12 - concretized		
pilot - used strike over line for may; '...' for set		
Abs		
“I could get it at the first glance” “Easier to notice and more intuitive”, “would be more efficient in bigger diagrams” “I find it cognitively effective” “It’s easier to associate an image to the concept… this particular image really makes sense” “… clearly denoted that it was a collection” “easy to see that there can be multiple” “quick overall sense”		
Var		
"I like the cloud notation"		
"easier to understand and track"		
"the annotation cause my mind to mess up"		
"cloud does not associate to variation for me" (still preferred graphical)		
"not very indicative... you may come up with a better graphical notation" (pref ann)		
"it took me 3x as long to draw the cloud... takes up too much space"		concern about scalability (p6 - may)
"cloud != var in my head" (still preferred graphical) (p8)		want subset of mergeable elements (p8)
"immediate able to denote... just by scanning"; "cloud triggers instant association..."		wants to see how mutliple uncertainties combine (p8)
"stands out more... can quickly identfy it"		Have doubts as to what happens with too many colours and multiple syntaxes on same element
May		
intuitive and easy to remember (graphical)		
It keeps the diagrams cleaner (ann)		
Writing (M) is easier than drawing dashed things; although the dashed is easier to see		
dashed lines make perfect sense		
Dotted lines intuitively conveyed intended semantic		
May Formula		

intuitive and easy to remember		
could get the alternative more easily, more powerful (ann); analyzing alternatives in graphical one was hard		
The formula notation is more powerful and cleaner		
Formula is much clearer and understandable		
Learning curve is a bit steep, but makes sense and way easier than a formula (gr)		
Use of colour made it obvious which things were grouped, bubbles... were helpful in identifying clauses		
The formula is more commonly known		
Much easier to read (gr)... avoids propositional formula without loosing information... really easy to visualize all the choices in your ind simultaneously which isn't possible with the other syntax; [dependency part was unintuitive - should be bigger]		
Overall		
The annotations are very similar so meanings are almost overloaded and I had to think to remember the meanings		
Propose a combination (V,S gr; M ann) x2		
Graphical is more self explanitory and can be clearer in a more complex diagram; and at a glance gives an overall view of how much uncertainty of each type there is		
"... the text that I did not get for most parts"		
Annotations are easier to add/remove to existing models		
Graphical can convey much more info and easy to disambiguate		
easier to visualize/process/make decisions since we can see all the information simultaneously and help to associate the idea in our mind		
prefer annotation for writing, gr for reading		