

Appendix B

Case Study Results

This appendix firstly gives the results for the four case studies that were carried out for this study. The answers to the open-ended questions were categorised and are presented here, together with the students' and the observers' observations of the interaction of the groups. The statistics associated with the students' learning of the modelling techniques are also given for Case Studies 2 and 4. The last section is a comparison of the quantitative results from the main questionnaire for the four case studies. Where the questionnaires were modified this is also discussed. The discussion of the results is found in Chapter 8.

B.1 RESULTS OF CASE STUDY 1

Case Study 1 was done as a pilot study. The students were given only one questionnaire with both open and closed questions. The questionnaire can be found in Appendix A.1. There were 90 students in the class with 75 of them completing the questionnaire. The qualitative results will not add up to 75 as some students put more than one answer per question and others put no answers. The answers from the open ended questions were categorized to help gain insight into the students' answers.

B.1.1 Working in groups - Case Study 1

How much did you enjoy working in groups? - Question 7.

When asked to explain what they enjoyed the most or disliked the most, some interesting comments were found. The numbers in brackets are the quantity of people who gave the answer or one that could be categorised as that answer.

- Hearing other people's ideas (26);
- Interacting with other people (18);
- Working as a team (10);
- Able to argue, debate and reason with one another (9);
- Meeting and working with people I would not normally work with (8);
- Enabled me to take part (7); and
- Helps us to understand better (3).

There were also factors that students disliked about the group process.

- People who did not contribute (19);
- People who took over and dominated the group (7);

- People chatting and getting no work done (3);
- The argument and chaos (3); and
- Language differences (3).

When you were a member of the group and not the JAD facilitator, did you feel that the facilitators gave you a chance to have your say when you wanted to? - Question 10.

The open-ended questionnaire results indicated why the students answered as they did:

- The facilitators TRIED to accommodate everyone (14);
- Everyone was able to have their opinions taken into consideration (13);
- Some of the facilitators had problems (10):
 - Some were unable to control the group (4);
 - Some only chose certain people to answer questions (3); and
 - Some were themselves too dominating (1).
- I made myself heard (3).

Did you feel that you were able to contribute to the group? - Question 11.

The students' answers were categorised into the following:

- My input was listened to and taken notice of (17);
- If we differed on some point then we could say so (5);
- Others would be quicker than me so I would not say anything (4);
- Sometimes I did not understand the work (4); and
- I did contribute but the others did not take notice of my contribution (2).

Did you feel that all group members made contributions to the group? - Question 12.

The students answered as follows in the open-ended part of the question:

- A large number of students said that most of the students contributed but there were usually some who did not (41):
 - Attributed this to shyness on the part of the students (10);
 - Attributed this to laziness on the part of the students (6); and
 - Attributed it to some people knowing more than others (3).
- Everyone worked well together (6); and
- We made sure that everyone participated by asking them questions (3).

Did you feel accepted as a group member? - Question 13.

The open-ended questions showed that students answered the way they did for the following reasons:

- The atmosphere was friendly (10);
- People listened to me (7);

- I was usually in a group with friends (5); and
- Some students formed clicks and did not accept others (2).

B.1.2 Learning in groups - Case Study 1

The students were asked only one question in this category in Case Study 1.

Do you feel that the JAD techniques used in the classroom are effective in helping you to learn? - Question 14.

The comments made by the students showed that they had insight into what we were trying to achieve:

- Helps me to think and understand the work better (16);
- Helped to hear other people's opinions (12);
- Working practically helped me to remember and learn (10); and
- Helps in tests and exams (5).

B.1.3 Facilitation and language - Case Study 1

The students were asked how they enjoyed being the facilitator and then were asked to describe what they enjoyed most or disliked most about it. They were also asked about their experiences with the different languages in the group.

How did you enjoy being the JAD facilitator? - Question 8

The reasons that the students enjoyed facilitation were shown in the qualitative results by the following answers:

- The feeling of being in control (21);
- Getting people to work together towards a solution (14);
- Helped me to learn to speak in public (5);
- Nothing (5); and
- I was never the facilitator (3).

The things that the students disliked were:

- People who did not co-operate (17);
- Feeling that they could not control the group (5);
- People who would take over the discussion (5);
- Speaking in front of people (4); and
- The responsibility (4).

When you were JAD facilitator were you able to communicate in your home language? - Question 9

The students were then asked to comment on their experiences if they were to use only English as the medium within the group – only second language English students were

asked to comment.

- No problem (21);
- English should be used as we can all understand it (6);
- Would be easier to use my own language (4);
- Sometimes difficult to get my point across in English (3); and
- Helps me to learn English (2).

B.1.4 Use of JAD - Case Study 1

The students were asked whether they thought the modelling techniques would be useful in industry and why they thought the method was used.

Do you think that the modelling techniques you have used this year will be useful in industry? - Question 2.

The open-ended questions showed the following:

- Useful for systems analysis and design (28). Some of these went on to say that it was not useful for everything, only for systems analysis and design;
- Helps us develop the skills we need for industry (7);
- I do not know what happens in industry (6);
- Systems are similar to those used in industry (3); and
- Industries all differ and change rapidly so will not always be useful (3).

Why do you think that JAD techniques were used in the classroom? - Question 16

Their answers were:

- Get us used to what happens in industry (25);
- Teaches us to work in groups (18);
- Helps us improve personally (15):
 - Communication improves (9).;
 - Leadership improves (3); and
 - Gain confidence in yourself (2).
- Helps us to understand what we are learning (13); and
- Forces us to participate (10);

B.2 RESULTS OF CASE STUDY 2

The data from this case study was collected using a main questionnaire, the group questionnaires given to the students to assess their group processing and by having an observer in the classroom. The observer was a colleague from Staff Development at the Port Elizabeth Technikon. The qualitative comments from the students' answers to the open-ended questions are presented first. The quantitative results can be found in the tables in Section B.5, where they are compared to Case Studies 1,3 and 4.

B.2.1 Main questionnaire results - Case Study 2

The students were given a questionnaire with both open and closed questions. The questionnaire can be found in Appendix A.2. There were 113 students in the class with 87 completing the questionnaire. The qualitative results will not add up to 87 as some of the students put more than one answer per question, while others did not answer the open-ended part at all. The questionnaire was fairly similar to that used the previous year but was modified by adding some questions.

B.2.1.1 Working in groups - Case Study 2

How did you experience working in a group? - Question 6

The open-ended questions were used to determine what the students had enjoyed most or disliked most about working in the JAD groups. The number in brackets refers to the number of people that gave an answer that could be categorised as that answer.

- Interacting with other people (20);
- Hearing other people's ideas (18);
- Working as a team (15);
- Getting a good solution together (9);
- Facilitating (8);
- Debating, arguing and reasoning with one another (8);
- Meeting and working with people that I would not normally work with (7);
- The laughs (2); and
- Enabled me to have my say (2);

There were also a number of things that people disliked about the group work:

- People who did not contribute (19);
- People not taking my ideas into consideration (10);
- People who take over and dominate the group (8);
- Takes a lot of time (5);
- Conflict (5);
- People chatting and getting no work done (4);
- Difficult to hear (4); and
- Being facilitator (3).

When you were a member of the group and not the JAD facilitator, did you feel that the facilitators gave you a chance to have your say? - Question 9

The open-ended questions were answered very similarly to the previous case study:

- Everyone was able to have their opinions taken into consideration (19);
- The facilitators tried to accommodate everyone (16);
- Some facilitators had problems (11);

- Some only chose certain people in the group (3);
- Some were unable to control the group (2);
- Some were too dominating (1);
- Some people thought that they were always right (6);
- Sometimes my ideas were ignored (6); and
- I only spoke if the facilitators asked me something (2).

Did you feel that you were able to contribute to the group? - Question 10

Some of the comments made by the students were:

- My input was listened to and taken notice of (32);
- If we differed on some point then we could say so (13);
- Other people would jump ahead and say something, then I would not say anything (4);
- I am shy and was not able to explain (4);
- Sometimes I did not understand the work (3); and
- I did contribute but was not taken notice of (2).

Did you feel that all group members made contributions to the group? - Question 11

The open-ended questions gave some insight into this question:

- Most contributed but there were usually some who did not (40);
Attributed it to:
 - shyness (11);
 - laziness (3);
 - domination by some (3);
 - people having their own conversations (3);
 - minorities feeling intimidated (2);
 - people not becoming part of the group (2); or
 - some knowing more than others (1).
- Everyone worked well together (27).

Did you feel that you were accepted as a group member? - Question 13

The explanations given by the students in the open-ended part of the questionnaire were:

- The atmosphere was friendly (18);
- People listened to me (14);
- We treated each other equally (5);
- My ideas were ignored (4); and
- I was the odd one out (2).

B.2.1.2 Learning in groups - Case Study 2

Do you feel that the JAD techniques used in the classroom are effective in helping you to learn? - Question 14

In the open-ended questions the following answers were given to explain their answers:

- Helped me to hear other people's opinions (14);
- Helped me be more sure about how to use ERDs and/or Use Cases (12);
- Helped me learn about JAD (9);
- Some people who answered that they only learnt a little then specified that this was because they already knew most of it (5).;
- Working practically helped me think better (5);
- Getting more difficult problems helped me learn more (4);
- Helped me sort out some errors that I had been making (3);
- Helped me to revise for exams (2); and
- I learn in my own way (2).

Do you feel that the JAD techniques helped you to learn how to feel more confident about how to act within a group? - Question 15

Some of the comments made by the students included:

- I feel less intimidated about sharing my ideas (10);
- I am fairly confident so it only helped me a little (10);
- You learn how to interact with other people better (7);
- Showed me that I can work in groups (2); and
- It forced me to participate which was good (2).

Do you feel that the JAD technique has helped you to learn to interact with other people? - Question 16

Many students did not fill in this section but those who did said:

- It helped me to listen to other people and give them a fair chance (6);
- I learned how to get many people's ideas and come to a decision (6);
- I learnt to speak freely in front of other people (5);
- I still feel shy but it did help me communicate better (4); and
- I met new people and learnt to interact with them (2).

Do you feel that the JAD technique has helped you to learn how to speak in front of small groups of people? - Question 17

Some of the comments made were:

- I feel more confident about speaking in front of people than I was before (19);
- I like to talk in front of people (6);
- It helped me learn to speak in front of people I did not know well (4);
- Being with friends made it easier than it would be in industry (4); and

- I still can't talk in front of people (4).

B.2.1.3 Facilitation and language - Case Study 2

The students were asked about how they enjoyed being the facilitator as well as their experiences of using English when facilitating.

How did you experience being the JAD facilitator? - Question 7

The students were asked to comment on what they enjoyed most and what they disliked most about being the facilitator. On the positive side the answers could be categorized as follows:

- Having control (17);
- Getting people to work together towards a solution (12);
- Structuring the ideas of others to get a good solution (8);
- Drawing on the board (8);
- Arguing (5);
- Everything (4);
- Giving everyone a chance to participate (3);
- Helped me learnt to speak in public (3); and
- Nothing (2).

On the negative side, the following comments were received:

- People who did not participate (12);
- Feelings of not being able to control the group (9);
- People who did not listen (7);
- Nothing (6);
- Drawing the diagrams on the board (5);
- Noise (4);
- Speaking in front of people (4);
- Not understanding what people were trying to tell me (4); and
- Not understanding the techniques well myself (4).

When you were the JAD facilitator were you able to communicate in your home language? - Question 8

The open-ended questions yielded the following comments:

- No problem (22); and
- Sometimes it is difficult to get my point across in English (4).

B.2.1.4 Use of JAD - Case Study 2

There were two questions asked in this section. The first concerned the use of the modelling techniques in industry and the second concerned why they felt that the lecturer had chosen to use these techniques in class.

Do you think that the modelling techniques that you have learnt this year will be useful in industry? - Question 5

Some of the comments made by the students included:

- The techniques are useful for Systems Analysis and Design (25);
- Helps us develop some of the skills we need in industry (9);
- Good method of actively involving users (6);
- Teaches us listening and communication skills used in industry (5);
- Teaches us the group skills needed in industry (4);
- You teach it to us (2);
- Systems are similar to those used in industry (2); and
- We will not use everything that we learn in industry (2).

Why do you think that JAD techniques were used in the classroom? You may mention more than one reason. - Question 18

This was an open-ended question only. The students answers can be categorized as follows:

- Helps us get used to what happens in industry (32);
- Teaches us to work in groups (29);
- Helps us understand what we are learning (13);
- Gives us JAD skills (13);
- Teaches us to interact with other people (11);
- Helps us improve our communication skills (11);
- Helps us gain confidence in ourselves (11);
- Teaches us to respect others (3);
- Lets us get the opinions of others (3);
- We learn to know one another (2); and
- We see the importance of user input (2).

B.2.2 Group questionnaires - Case Study 2

The students were asked to evaluate their functioning as a group after the first JAD session and after the third (and last) JAD session. Table B.1 gives an indication of their response to the questions asked. The answers to the questions went from 1 to 5 with 1 meaning ALWAYS and 5 meaning NEVER. The column labelled shift wanted gives an indication of the direction in which one would have hoped that the mean would shift as some of the questions were asked with a positive bias and others with a negative one.

As the students answered the questionnaire anonymously, no comparison could be made on an individual level and the Mann Whitney test was used to determine if there was a significant shift in the two distributions. The Mann Whitney statistic is given by the symbol "U" and the associated normal value by the value "Z". A p-value less than 0.05 is considered to be significant.

	Valid N - Time 1	Mean - Time 1	Valid N - Time 3	Mean - Time 3	Shift in Mean	Shift wanted	U	Z	p-value
1. We made sure that everyone understood the objectives for the session at the start of the session	94	2.12	91	1.60	-0.52	-	3271	-2.981	0.0029
2. The group members listened to and responded to the other member's ideas and comments	93	1.71	91	1.68	-0.03	-	4227	-0.013	0.9890
3. The group members were all involved and participated in the discussion	94	2.03	91	1.95	-0.09	-	3998	-0.812	0.4168
4. Dominant members were allowed to dominate the group	93	3.67	91	3.62	-0.05	+	4106	-0.359	0.7193
5. Group members involved themselves in private conversations thus disturbing the group	94	3.78	91	3.82	0.05	+	4202	-0.213	0.8313
6. The atmosphere of the group was friendly and open	94	1.51	91	1.43	-0.08	-	4257	-0.065	0.9485
7. The group has been able to discuss differences between the ideas of the group members and does not avoid conflict	93	2.09	91	1.81	-0.27	-	3437	-2.329	0.0193
8. Discussions were held which were irrelevant to the topic	94	4.36	91	4.35	-0.01	-	4186	-0.282	0.7780
9. Group members supported one another	94	1.85	90	1.87	0.02	-	4177	-0.157	0.8753
10. I was able to contribute to the group	94	1.71	91	1.59	-0.12	-	4039	-0.720	0.4714
11. The other team members contributed to the group	94	1.80	91	1.58	-0.22	-	3763	-1.560	0.1188
12. The facilitator determined if the members of the group had reached consensus before moving on to the next point	93	2.12	91	1.90	-0.22	-	3225	-2.975	0.1473
13. Group members were sensitive to my feelings	92	2.43	91	1.97	-0.47	-	3220	-2.810	0.0050
14. The group members participated to the best of their ability	94	1.89	91	1.68	-0.21	-	3716	-1.673	0.0944

	Valid N - Time 1	Mean - Time 1	Valid N - Time 3	Mean - Time 3	Shift in Mean	Shift wanted	U	Z	p-value
15. People pushed their own views without trying to explain them to the others	94	3.94	91	3.92	-0.02	+	4221	-0.160	0.8753
16. Group members were encouraged to ask questions	94	2.49	91	2.05	-0.43	-	3239	-2.964	0.0030
17. The group was able to structure the session	94	2.32	91	1.91	-0.38	-	3288	-2.858	0.0043
18. We checked our progress and were able to complete the task in the allotted time	91	2.35	89	1.81	-0.54	-	3145	-2.722	0.0065
19. People constantly interrupted me and I was unable to make my point	94	4.04	91	4.19	0.14	+	3813	-1.362	0.1732
20. The facilitator was able to take the discussions from various group members and make sense of them on the board	94	2.09	90	1.64	-0.44	-	3225	-2.982	0.0029

Table B.1: Group processing at time 1 and time 3

Observations of group processing

Four of the groups were also evaluated by an independent observer who gave her impressions of the group processing according to the same questionnaire as the students. The observer was only able to spend about 10-15 minutes with each group. The observer also gave some open comments on the different groups which are discussed below. She was not able to give feedback on all the questions and those that were not answered have been left out of Table B.2.

The groups have been numbered from 1 to 4 and the column heading Self refers to the average that the students in the group gave themselves. The column labelled Obs refers to the value that the observer gave the group. This was done after Session 3.

Group 1 was observed to have 2 strong members who skewed the participation. The black group members were also not given an equal chance of participation and were not treated as being of equal status. The observer's comments are also backed up by the group's answers to the question on domination where the students' answers ranged from 1 through to 5 showing the different student's perspective on this. The observer's evaluation of this group and that of the students seemed to be fairly similar in most of the questions (within 1 point.) The only one's with a larger discrepancy being the one on domination and the one on the friendliness of the group where the students experienced the group as being more friendly than the observer felt they were.

Group 2 was observed to be very task oriented. The participation here was observed to be equal and the group members of equal status. The observer differed from the students evaluation of themselves by more than 1 point on a number of questions.

The students did not feel that they were as good at making sure objectives were understood as the observer felt they were. The fact that the observer felt that they did not hold discussions irrelevant to the topic but that the students felt that they sometimes did, is probably due to the students being aware of the observer and keeping to the topic when she was there. The observer felt that the students did encourage one another to ask questions. Looking at the individual student's responses to this, one finds a wide discrepancy for this question with the students answers ranging from 1 through to 5. The fact that the observer was only there for 10-15 minutes could explain why there is a difference between the way the students see their ability to structure the session and the way the observer saw this. The ability of the facilitator to put the discussion of the group on the board was also different but it would probably depend on who facilitated during the time that the observer was there.

Group 3 had 3 females who tended to dominate the group according to the observer. The white males would relax and watch and participate every now and again. The black members did not participate at all. One of the black group members in this group was an A-aggregate student so it was disappointing to note that there was this problem in this group too.

	Group 1		Group 2		Group 3		Group 4	
	Self	Obs	Self	Obs	Self	Obs	Self	Obs
1. We made sure that everyone understood the objectives for the session at the start of the session	1.57	-	2.75	1	2	-	1	-
2. The group members listened to and responded to the other member's ideas and comments	1.86	2	2.00	1	2.00	2	1.57	3
3. The group members were all involved and participated in the discussion	1.86	2	1.75	1	2.67	5	1.86	3
4. Dominant members were allowed to dominate the group	3.14	2	4.75	5	3.67	1	3.29	1
5. Group members involved themselves in private conversations thus disturbing the group	4.00	4	5.00	5	3.83	3	4.00	5
6. The atmosphere of the group was friendly and open	1.43	3	2.00	1	1.83	3	1.14	3
7. The group has been able to discuss differences between the ideas of the group members and does not avoid conflict	1.57	2	1.75	1	2.67	3	1.71	4
8. Discussions were held which were irrelevant to the topic	4.43	5	3.75	5	4.00	5	4.57	5
9. Group members supported one another	2.00	2	1.75	2	2.33	2	1.00	3
10. I was able to contribute to the group	1.57	-	1.00	-	2.17	-	1.57	-
11. The other team members contributed to the group	1.43	2	1.00	1	2.00	3	1.00	3
12. The facilitator determined if the members of the group had reached consensus before moving on to the next point	2.00	2	2.25	2	2.67	2	1.29	2
13. Group members were sensitive to my feelings	2.29	-	1.75	-	2.50	-	1.00	-
14. The group members participated to the best of their ability	1.43	2	1.00	1	2.33	3	1.29	2
15. People pushed their own views without trying to explain them to the others	3.57	4	4.00	4	3.33	4	4.57	2

	Group 1		Group 2		Group 3		Group 4	
	Self	Obs	Self	Obs	Self	Obs	Self	Obs
16. Group members were encouraged to ask questions	2.00	2	2.50	1	2.33	2	1.43	2
17. The group was able to structure the session	2.14	1	3.25	1	2.33	3	1.57	2
18. We checked our progress and were able to complete the task in the allotted time	2.80	-	2.75	-	2.33	-	1.14	-
19. People constantly interrupted me and I was unable to make my point	3.57	-	4.50	-	3.50	-	4.86	-
20. The facilitator was able to take the discussions from various group members and make sense of them on the board	1.71	2	2.25	1	2.33	-	1.33	-

Table B.2: Observer versus self evaluation of group processing - Time 3

The group members did feel that there was some problem with their participation and put the value between 1 and 4 with an average of 2.67. The observer saw it as more of a problem and put the value at 5 ie never. The observer saw the problem of domination in this group with the 3 females dominating. It is possible that the students did not see it as a problem because there were 3 people involved. The group once again saw itself as being friendly although one student in the group gave the same value as the observer ie 3. In all other aspects, the students and the observer had similar views of the group (within 1 point.)

Group 4 enjoyed participation by all but did have one member who tried to dominate the group. The observer also felt that the black group member in this group was not treated as being of equal status although they did try to participate. The observer almost consistently put this group as worse than they saw themselves. This was true with respect to listening, participation, domination, friendliness, handling of conflict, support of one another, contribution and people pushing their views onto the group.

It is difficult to tell why this is true as the students in the group seemed to experience the group in a positive way. All the students except 1, for example, said that the group was ALWAYS friendly (1) and that one gave the group a 2. The group members themselves felt that the group supported them - all giving a 1 - but the observer felt that the group only deserved a 3 for this. No reason for this discrepancy could be found.

B.2.3 Assessment of students' learning - Case Study 2

The students were given a pre-test of their knowledge of use cases and the examination question served as a post-test. The three Information Systems II lecturers were satisfied that the questions were of the same standard. This was not done for the ER diagrams although more time was spent on these as the question in the examination was much more difficult than that of the test.

It must be remembered that no effort was made to stop the students from doing any extra studying of their own as this was felt to be unethical and not in line with the attempt to study the topic in context. Table B.3 shows the results of the t-test done for the dependent samples.

All the criteria for a t-test are satisfied and the p-value is extremely low which indicates that the difference between the mean for the pre-test and post-test cannot be attributed to chance. The p-value is much less than 0.05 which indicates that the difference between the means is very significant.

	Mean	Std Dev	N	Diff	Std Dev Diff	t	df	p-value
PRE%	70.265	15.038	113					
POST%	79.281	14.979	113	-9.016	14.846	-6.456	112	2.86E-09

Table B.3: T-test results for marks for Use-Cases

As one can see clearly from the graph in Figure B.1, there was a definite improvement in the marks of the students at all levels (except those who had exceptionally high marks). The red line shows the line for the regression analysis with the dotted line showing the line with 95% certainty. The formula for the red straight line is $\text{Post-Test \%} = 43.535 + 0.50874 * \text{Pre-Test\%}$. The correlation value $r = 0.51078$.

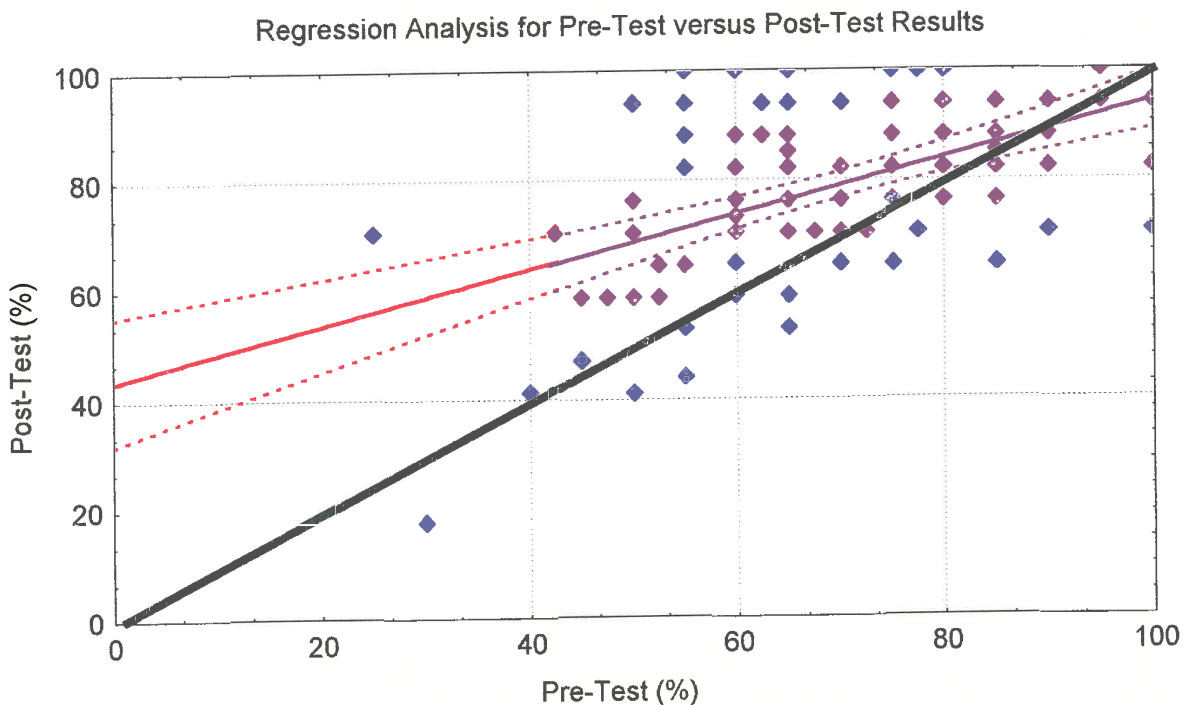


Figure B.1: Scatter plot showing pre- and post-test results - Case Study 2

B.3 RESULTS OF CASE STUDY 3

B.3.1 Main questionnaire results - Case Study 3

The students were given a questionnaire with both open and closed questions. The questionnaire was an adaption of the one used in Case Study 2 and 3 and can be found in Appendix A.3. In total 61 students completed the questionnaire. The qualitative results from the open-ended questions are given along with the qualitative results. Where students exact words are used, there may be some grammar errors as English was often the students' second or third language.

B.3.1.1 Working in groups

How did you experience working in groups? - Question 6

There were many reasons that the students gave to indicate what they enjoyed most about working in groups. The numbers in brackets indicate the number of students whose answers could be categorized as this answer:

- Hearing other people's ideas (22);
- Interacting with other people (11);
- Helped me to understand better (8);
- Getting a good solution (7);
- Being able to argue, debate or reason with one another (6);
- Helped me to have other people criticise my ideas (3); and
- Learnt how to control my emotions and behave in a group (2).

The students were also asked to comment on the thing that they disliked the most. On the negative side, some of the more common comments were:

- People who did not contribute (6);
- Conflict (6);
- People having private conversations (5);
- Nothing (5);
- People who try to dominate the group (4);
- I like working alone (4); and
- It takes a lot of time (2).

When you were a member of the group and not the facilitator, did you feel that the facilitators gave you a chance to have your say? - Question 9.

On the open-ended question many of the answers could be categorised as shown below:

- The facilitators tried to give everyone a chance (20);
- Facilitators tried to make sure that everyone participated (11);

- Everyone was able to have their opinions taken into consideration (5); and
- I made myself heard (2).

Did you feel that you were able to contribute to the group? - Question 10.

Some of the more common answers in the open-ended section were:

- My input was listened to and taken notice of (10);
- My ideas were often used by the group (7);
- If we differed on some point then we would say so (4);
- Facilitators got us all to participate (4); and
- I was able to have my say (2).

Did you feel that all group members made contributions to the group? - Question 11.

Categorising the answers from the open-ended questions gives the following:

- Everyone worked well together (17);
- Most contributed but there were some who did not (6);
 - attributed this to shyness (1)
 - attributed it to some knowing more than others (1)
- Some just agreed to everything (6); and
- We made sure that everyone participated by asking questions (3).

Did you feel that you were accepted as a group member? - Question 12.

Some of the students' answers could be categorized as follows:

- People listened to me (15);
- The atmosphere was friendly (10); and
- I asked a lot of questions (2).

B.3.1.2 Learning in groups - Case Study 3

The questions asked were the same as in the previous case study.

Do you feel that the JAD techniques used in the classroom are effective in helping you to learn? - Question 14

Some of the comments made by the students in the open-ended part include:

- Helped to hear the opinions of others (5);
- Helped me to learn about JAD (5);
- Helped me to learn about ERDs (4);
- Working practically helped me to think better (3); and
- Helped me learn to communicate with others (2).

Do you feel that the JAD technique has helped you to learn to feel more confident

about how to act within a group? - Question 15

Only three common comments could be categorised in the open-ended answers. These were:

- I was shy but now I feel that I can share my ideas (8);
- It forced me to participate which was good (2); and
- You learn how to interact with people better (2).

Do you feel that the JAD technique has helped you to learn to interact with other people? - Question 16

The answers were categorized as:

- It helped me learn to listen to other people and give them a chance (5);
- I learnt to speak freely in front of other people (3); and
- I learnt to relate to other people (3).

Do you feel that the JAD technique has helped you to learn how to speak in front of small groups of people? - Question 17

There were only two comments made by more than one person. These were:

- I was shy but now I feel more confident about speaking in front of people (13);
or
- Helped me to speak English (2).

B.3.1.3 Facilitation and language - Case Study 3**How did you experience being JAD facilitator? - Question 7**

The students were asked to comment on what they liked and disliked about being the JAD facilitator. On the positive side, some of the comments made could be categorized as:

- Helped me to learn how to speak in front of other people (14);
- Liked having control (9);
- Liked getting people to work together towards a solution (7);
- Liked hearing other people's ideas (6);
- Enjoyed getting people to understand (2); and
- Helped me to feel more confident (2).

On the negative side people disliked:

- Nothing (9);
- People who did not cooperate (6); and
- People taking over the discussion (3).

When you were working in your JAD groups, were you able to communicate in your home language? - Question 8

After the quantitative question, the students were asked: *“If you were not able to communicate in your home language, mention the language that was used in your group and describe your experiences using that language.”*

Twenty-two of the students said that English was used in their group and 6 said that a mixture of Xhosa and English was used. Only six of the students commented on their having to use English and these said:

- It is good to use English as we will have to one day in industry (3); and
- It is good to use English as it is an international language (2).

B.3.1.4 Use of JAD - Case Study 3

Do you think that the entity-relationship modelling techniques that you have learnt this year will be useful in industry? - Question 5

Some of the comments that were most common included:

- Helps to clarify what users need (10);
- Useful for the Systems Analysis and Design phases (7);
- Helps us to develop the skills we will need in industry (7); and
- Systems are similar to those used in industry (5).

Why do you think that JAD techniques were used in the classroom? You may mention more than one reason. - Question 18.

This section had no quantitative part as the students' thoughts were wanted. The most common reasons given were:

- Helps us improve personally (15) because:
 - Improves our communication (10);
 - Helps us gain confidence in ourselves (5);
- Teaches us to work in groups (14);
- Gets us used to what happens in industry (11);
- Helps us learn about JAD (5);
- Helps us to understand what we are learning (4);
- Helps us learn to work with different people (3);
- Teaches us to contribute ideas (3); and
- Forces us to participate (2).

What method of learning the entity-relationship modelling techniques do you prefer? - Question 13

Almost all the students chose the JAD method. Their comments were:

- JAD helps us to share ideas (14);
- JAD helps improve participation (4);
- With JAD others can help me (3);
- With JAD we all combine our answers to get a better solution (2);

- IT will help us when we get into industry (2); and
- It is faster not to use JAD (2).

B.3.2 Group questionnaires - Case Study 3

The group questionnaire was only administered at the end of the first day and was mostly used to help the students to determine what their problems were. The questionnaire consisted of 20 questions and 2 open-ended questions. The 20 questions could be answered with a value from 1 to 5 with 1 meaning always and 5 meaning never. Each group's answers to the questionnaires were integrated to give the students feedback on their group processing. The questionnaire can be found in Appendix A.3 and the Table with the results in Table B.4.

An observer sat in the groups in East London over the two days and evaluated the 4 groups in East London. She spent approximately 20 - 30 minutes with each group. The groups have been numbered from 1 to 4 and the column heading Self refers to the average that the students in the group gave themselves. The column labelled Obs refers to the value that the observer gave the group. Note that the observer's comments for Groups' 3 and 4 were done on the second day, whereas the students filled in the group questionnaire on the first day.

On the whole the groups seemed to work well together. One of the problem areas seemed to be that the groups were not sensitive to the feelings of the other members of the group. There was also a bit of a problem with the ability of the facilitator to take the discussions of the various group members and make sense of them on the board. Two aspects that could also be improved include the participation by everyone and the groups' ability to discuss differences and not avoid conflict. On the whole, the atmosphere in the class was very positive and the participation by the students seemed to be good.

Looking at the individual groups, where an observer was present, shows up some of the more detailed problems that the students experienced. The facilitator found that the first facilitator used in Group 1 had a fairly strong personality. He tended to write down his own solution rather than involve the group. The group was, however, quick to correct him if necessary. After the first 10 minutes, the group relaxed and each began to contribute. The person who had been JAD facilitator made better contributions when relegated to the role of team member. The observer found that the students were trying to establish a 'pecking order' at first which effected the openness and trust of the group. The group seemed to settle after a while and the group dynamics improved. The observer was there for the first part of the lesson - about half an hour. The students and the observer differ on their perceptions of the domination in the group. They also felt that the group was friendly and open (1.6) whereas the observer had not experienced it as such (4). The same difference is found in the group supporting one another where the group gave themselves an average of 1.6 and the observer felt that this was only worth a 3. This may be because the students filled in the form at the end

	Mean Day 1	Group 1		Group 2		Group 3		Group 4	
		Self	Obs	Self	Obs	Self	Obs	Self	Obs
1. We made sure that everyone understood the objectives for the session at the start of the session	1.5	1.8	3	1.8	-	1	4	2.8	-
2. The group members listened to and responded to the other member's ideas and comments	1.3	2	2	2	2	1	3	1.5	2
3. The group members were all involved and participated in the discussion	1.3	1.4	2	1.4	2	1	1	2.7	4
4. Dominant members were allowed to dominate the group	4.4	4.2	3	4.8	3	2.4	4	4.7	4
5. Group members involved themselves in private conversations thus disturbing the group	4.7	3.4	3	4.2	5	5	4	4.8	4
6. The atmosphere of the group was friendly and open	1.2	1.6	4	1.4	1	1	1	1.3	3
7. The group has been able to discuss differences between the ideas of the group members and does not avoid conflict	2.1	2	3	2	2	2.4	1	1.2	2
8. Discussions were held which were irrelevant to the topic	4.5	4.4	5	5	5	3.4	5	3.8	5
9. Group members supported one another	1.4	1.6	3	2.8	2	1	1	1.8	3
10. I was able to contribute to the group	1.1	1.2	-	1	-	1	-	1	-
11. The other team members contributed to the group	2.3	3	2	1.4	2	3.4	2	2.2	2
12. The facilitator determined if the members of the group had reached consensus before moving on to the next point	1.4	2	4	1	1	1.2	4	1.5	2
13. Group members were sensitive to my feelings	3.1	2.8	3	2.8	2	2.8	2	1.7	2
14. The group members participated to the best of their ability	1.2	2	1	1	1	1	1	1.5	4
15. People pushed their own views without trying to explain them to the others	4.6	4.4	4	4.6	4	4.6	4	4.5	4

	Mean Day 1	Group 1		Group 2		Group 3		Group 4	
		Self	Obs	Self	Obs	Self	Obs	Self	Obs
16. Group members were encouraged to ask questions	1.5	2	2	1	1	1	4	1.5	4
17. The group was able to structure the session	1.6	2.2	4	1.6	2	1.2	2	1.5	2
18. We checked our progress and were able to complete the task in the allotted time	2.0	2.4	-	2.6	-	1	-	2.5	-
19. People constantly interrupted me and I was unable to make my point	4.4	4	4	3.8	5	4.4	3	4.8	5
20. The facilitator was able to take the discussions from various group members and make sense of them on the board	2.5	2.8	2	2.3	2	2	4	1.5	1

Table B.4: Group processing evaluation - self and observer

of the hour and that the atmosphere had improved throughout the session. The lecturer had also noticed that the students in this group had a difficult time getting going but became more and more productive as time progressed. The observer felt that the facilitator almost never (4) determined that the group had reached consensus before moving to the next point, whereas the students felt that they almost always did this (2).

Group 2 was an interesting group. The group was made up of all girls, most of whom had very strong personalities and very definite ideas as to what should be done. During the first part of the JAD session, the lecturer had to interrupt them a few times to ask them to respect what each other was saying and to listen to one another. They were all talking at once and the facilitators were unable to control the session. The group improved, however, and by the time the observer got there, they were working quite effectively together. It was interesting to note that they gave themselves a rating of 4.8 for almost never allowing dominate members to dominate the group. The observer gave them a 3. It depends on what is meant by being allowed to dominate. Most of the members were trying to be dominant at first, but it is true that the others would not allow them to dominate as they, themselves, were also trying to dominate. One problem that this group had was their lack of support for one another. It is interesting to note that the students gave themselves a 3.8 average for the problem of being interrupted whereas the observer gave them a 5 ie. the observer never saw any problem. This could be an indication of the growth that took place in this group as the time progressed. At the start of the session, the lecturer would have said that the group deserved a 1 or 2 for this but they were really working well together towards the end.

The observer found Group 3 to be very open and relaxed with each other. They did not seem to feel threatened when other people disagreed with them and they worked well together as a team. She found, however, that the facilitators did not really guide or lead the discussion and that the only difference between the facilitators and the other group members was that the facilitator was writing on the board. The group themselves had felt after the first session that they had a problem with avoiding conflict (2,4) but this was not evident on the second day to the observer who gave them a 1 to say that they were always able to discuss their differences and did not avoid conflict. The team themselves felt that the facilitator determined if they had reached consensus before moving to the next point (1,2) and that the group was encouraged to ask questions (1). The observer felt that this was not the case and gave them 4 for each of these questions, meaning that they almost never were able to do this. There was also a difference of opinion about people interrupting one another and the facilitators ability to make sense of the discussions on the board.

The last group also did their self evaluation on day 1 and was observed on day 2. The observer found that the facilitators asked leading questions and encouraged group members to question and justify their decisions. She found that the facilitators tried to draw all the team members into the discussion. There were, however, two very quiet team members who did not contribute much despite the facilitators encouragement. This would account for the low score by both observer (4 - for question 3 and 14) and

themselves (2.7 for question 3 and 1.5 for question 14) for this aspect. From the observers comments, one would have expected that the group would score quite well on the fact of being encouraged to ask questions. This was not so, however, and the observer gave the group a 4 - meaning almost never - whereas the group gave themselves a 1.5. The group felt that they were friendly and open (1,3) but the observer felt that they were less so (3). This difference was also found in their supporting one another where they rated themselves with a 1,8 but the observer only gave them a 3. Another point where a difference was found was in whether they held discussions which were irrelevant to the topic. The students felt that they sometimes had a problem with this (3,8) whereas the observer did not find so (5). This could be because the students stopped having irrelevant discussions when the observer was there. Another explanation is that the students spoke Xhosa, which the observer could not understand.

B.4 RESULTS OF CASE STUDY 4

B.4.1 Main questionnaire results - Case Study 4

The students were asked the same questions as the previous year in Case Study 2. The questionnaire can be found in Appendix A.2. There were 129 students in the class and 117 completed the questionnaire.

B.4.1.1 Working in groups - Case Study 4

How did you experience working in a group? - Question 7

The open-ended questions were used to determine what the students enjoyed most and disliked the most about working in groups.

They enjoyed:

- Hearing other people's ideas (41);
- Working as a team (26);
- Enabled me to share my ideas (19);
- Interacting with other people (17);
- Working together to achieve our goal (16);
- The friendly people (11);
- Able to argue, debate and reason with one another (7);
- Helps us to understand better (7);
- Relaxed environment (3); and
- People listened to me (2).

There were also a lot of negative comments although not nearly as many as the positive. Students mentioned the following:

- People who did not contribute (18);
- People who take over and dominate the group (11);

- People having private conversations (7);
- Time consuming (5);
- Wandering off the topic (4);
- People not taking my ideas into consideration (4);
- Noise (3);
- People not knowing the techniques (3);
- Not doing IS2 meant that I did not know the techniques (2); and
- Being facilitator (2).

When you were a member of the group and not the facilitator, did you feel that the facilitators gave you a chance to have your say? - Question 10

The open-ended questions brought many responses:

- Everyone was able to have their opinions taken into consideration (30);
- Facilitators tried to accommodate everyone (14);
- I was given a chance to speak if I wanted to (14);
- Some of the facilitators had problems (13)
 - Only listened to some people (3);
 - Were unable to control the group (3);
 - Allowed some people to dominate (3);
 - Wanted to use their own ideas (2);
 - Allowed people to interrupt me (1);
 - Had no idea what to do (1);
- I gave my views, others gave theirs, we discussed and came to a decision (7);
- Facilitators asked questions to everyone (7);
- I was asked my opinion (2); and
- We worked well together (2).

Did you feel that you were able to contribute to the group? - Question 11

The students comments on this question were:

- My input was listened to and taken notice of (18);
- My ideas were often used by the group (13);
- I spoke when I thought it necessary (11);
- We used my ideas to discuss and come to a conclusion (9);
- Everyone's ideas were discussed and considered (9);
- I tried my best (4);
- I always gave my ideas (4);
- Sometimes I did not understand the work (3); and
- The group was friendly so it was easy to contribute (2).

Did you feel that all group members made contributions to the group? - Question 12

The open-ended questions show the following:

- Most contributed but there were some who did not (56)
Attributed it to:
 - some knowing more than others (10);
 - shyness (4);
 - language differences (3);
 - laziness (1);
 - size of group (1);
- Everyone worked well together (25);
- Some people dominated (2);
- Some people had private conversations (2); and
- Everyone tried their best (2).

Did you feel accepted as a group member? - Question 13

This is also shown in the open-ended question results:

- The atmosphere was friendly (24);
- People listened to me (21);
- The group treated me with respect (11);
- Everyone was accepted (7);
- I did not feel left out (5); and
- Everyone was included (4).

B.4.1.2 Learning in groups - Case study 4

The students were asked questions about whether they perceived that they had learnt through the JAD sessions. They were asked about their learning in general, the group skills learnt, whether they felt they had learnt to interact with others and whether they had learnt to speak in front of other people.

Did you feel that the JAD techniques used in the classroom are effective in helping you to learn? - Question 15

The open-ended questions revealed the following:

- Helped me to think and understand the work better (22);
- Helped to hear other people's opinions (14);
- Teaches us about group work too (9);
- Helped me learn about JAD (5);
- Knew it quite well but it helped me iron out some problems (5);
- Helped me prepare for IS2 for next year (3);
- Working practically helped me to remember and learn (3);
- Already knew it quite well so only helped a little (2); and
- People in the group explained to the others (2).

Do you feel that the JAD techniques helped you to learn how to feel more confident about acting within a group? - Question 16

The students' open-ended answers were similar to the previous year although the idea of feeling part of the group was more prominent in 2000.

- I feel less intimidated about sharing my ideas (16);
- I was shy at first but am now more confident (7);
- I am fairly confident so it only helped me a little (7);
- I felt like I was part of the group (6);
- You learn how to interact with others better (3);
- Forced me to participate - which was good (3); and
- I am still not very confident (3).

Do you feel that the JAD technique has helped you to learn how to interact with other people? - Question 17

Some of the comments made by the students were:

- I learnt to speak freely in front of people (13);
- I already knew how so it only helped a little (11);
- I met new people and learnt to interact with them (7);
- It helped me to learnt to listen to other people and give them a chance (6);
- I learnt to get many people's ideas and come to a decision (3);
- Helped me learnt to interact in a more business-like way (3);
- Helped me learnt how to interact with a group (3); and
- I still feel shy but it did help me to communicate better (2).

Did you feel that the JAD technique has helped you to learn how to speak in front of small groups of people? - Question 18

The students comments in the open-ended questions were:

- I feel more confident about speaking in front of people than I was before (20);
- It was not a problem before so I only learnt a little (7);
- I like to talk in front of people (6);
- Being friends made it easier than it would have been in industry (4);
- I still can't talk in front of people (4);
- Helped me with my English fluency (3); and
- Helped me not to be afraid (2).

B.4.1.3 Facilitation and language - Case Study 4

The question asked in the case study about being the facilitator was the same as in the previous case studies, namely:

How did you experience being the JAD facilitator? - Question 8

The students were asked to comment on what they enjoyed the most and what they disliked the most about being the JAD facilitator.

In the open-ended questions the following answers were received:

- Liked having control (36);
- Getting people to work together towards a solution (24);
- Felt more part of the group (7);
- Listening to others (6);
- Writing on the board (6);
- People listened to me (5);
- Learnt a lot (3);
- Helped me to learn to speak in public (2); and
- Able to give ideas (2).

On the negative side the following comments were made:

- People talking among themselves (12);
- People who did not co-operate (12);
- Speaking in front of people (7);
- Not knowing the IS2 work (4);
- Trying to get people to participate (4);
- People not listening (4);
- Having to explain to people who did not understand (3);
- Noise (3);
- Settling arguments (2); and
- People taking over the discussion (2).

When you were working in your JAD groups, were you able to communicate in your home language? - Question 9

They were further asked to comment on their experiences if they were unable to communicate in their home language.

It is only in the open-ended questions that one can determine if there was a problem with the language use and the students answered:

- No problem (27);
- English should be used as we all understand it (11);
- Sometimes difficult to get my point across in English (5); and
- Helped me to learn more English (3).

B.4.1.4 Use of JAD - Case Study 4

The students were asked about whether they thought the entity-relationship modelling techniques would be useful in industry as well as why they thought that the JAD techniques had been introduced into the classroom. The first question was slightly different from that used in Case Study 2 as it specified the entity-relationship techniques.

Did you think that the entity-relationship modelling techniques that you have learnt this year will be useful in industry? - Question 6

The students comments were similar to the previous year:

- Modelling helps you to understand the system better (22);
- Helps design databases (15);
- Useful for systems analysis and design (12);
- Helps us layout requirements logically (6);
- I do not know what happens in industry (6);
- Things may be quite different in industry (4);
- Helps you to think before you start a system (4);
- Helps to determine relationships (4);
- Helps in discussion with others (3); and
- Not practical for industry (2).

Why do you think the JAD techniques were used in the classroom? You may mention more than one reason. - Question 19

This was only an open-ended question and the students answers could be categorised as follows:

- Teaches us to work in groups (37);
- Gets us used to what happens in industry (36);
- Helps us improve our communication skills (26);
- Helps us interact with others (16);
- To help us understand the design techniques (13);
- Helps us learn to make group decisions (9);
- Helps us get to know one another better (8);
- Out leadership improves (6); and
- You gain confidence in yourself (6).

B.4.2 Group questionnaires - Case Study 4

The students were once again given questionnaires to evaluate their functioning as a group at the end of the first and last sessions. The results from the first session were analysed by the lecturer and given back to them as feedback for the second session. This was to help them evaluate their group processing and to see where they needed to improve and what their strengths as a group were.

Table B.5 gives an indication of their responses at time 1 and time 3. The answers to the questions were from 1 to 5 with 1 meaning ALWAYS and 5 meaning NEVER. As some of the questions were asked in a way where ALWAYS was negative and NEVER was positive, the shift wanted column gives an indication of the direction of the shift that one would have wanted. The Mann-Whitney test was used to determine if there was a significant shift in the distributions as the results could not be done using matched pairs because the students filled the questionnaire in anonymously. A p-value of less

than 0,05 is considered significant. The Mann-Whitney statistic is given by the symbol “U” and the associated normal value by “Z”.

Observations of group processing

An independent observer observed four of the groups. For Case Study 4, the observer did not fill in same questionnaire as the students but rather wrote his observations down in long hand. Some changes were made after the first session as a result of his observations and these will be noted here. These observations will be described here.

The groups will be called Group A, Group B, Group C and Group D.

Group A was a larger group of 9 students. The observer noted during the first session that the group tended to form smaller groups, some would speak through the facilitator and the others would hold private discussions. Sometimes even the facilitator would carry on a discussion with one group member and would allow the others to continue. He noted that the position of the group members - whether they were next to their friends or not - seemed to make this problem worse. A change in facilitator did improve things somewhat and more team members took part. Another problem was the position of the facilitator. The students had tended to put their desks quite close to the board and this meant that when the facilitator stood at the front of the group, he or she was still standing between the front people and would have his or her back to part of the group.

The lecturer acted on this information and in the following JAD session firstly made sure that the tables and chairs were correctly placed so that the facilitators could do their job without having their back to anyone. The lecturer also reminded the students of the instruction in JAD that users and IT people should be mixed in order to promote group cohesion and to prevent private conversation. This did seem to help the situation and could be included in the model for the effective use of JAD.

The observer found that the group still had some problems with personal discussions at the start of the session during the Time 3. He found that they became more task orientated and showed good group cohesion as the session progressed. The group as a whole seemed to be working together and taking part.

Group B also experienced the problem of the facilitator standing with his or her back to part of the group during the first session. The observer found that the facilitator seemed inaccessible and would look to one part of the group for input. There seemed to be one member who was seen as the leader and was consulted to make sure that he agreed before any decision was made. During the last session the observer found that the group members were all encouraged to participate and there was good group cohesion. One of the members was very quiet but did warm up as the session progressed. The observer said that the group seemed to be thinking in unison.

	Valid N - Time 1	Mean - Time 1	Valid N - Time 3	Mean - Time 3	Shift in Mean	Shift wanted	U	Z	p-value
1. We made sure that everyone understood the objectives for the session at the start of the session	109	2,06	120	1,89	-0,17	-	5811,5	1,45	0,124
2. The group members listened to and responded to the other member's ideas and comments	112	1,86	120	1,76	-0,10	-	6110,0	1,19	0,197
3. The group members were all involved and participated in the discussion	111	2,08	119	2,07	0,01	-	6566,5	0,08	0,937
4. Dominant members were allowed to dominate the group	111	3,50	117	3,86	0,36	‘+’	5496,0	-2,00	-0,038
5. Group members involved themselves in private conversations thus disturbing the group	111	3,82	119	4,00	0,18	‘+’	5871,0	-1,45	0,126
6. The atmosphere of the group was friendly and open	112	1,38	120	1,48	0,10	-	6454,0	-0,52	0,492
7. The group has been able to discuss differences between the ideas of the group members and does not avoid conflict	110	2,29	110	2,11	-0,18	-	5487,5	1,19	0,211
8. Discussions were held which were irrelevant to the topic	111	4,17	120	4,08	-0,09	‘+’	6250,0	0,81	0,378
9. Group members supported one another	112	1,89	120	1,78	-0,11	-	5995,0	1,42	0,125
10. I was able to contribute to the group	112	1,57	120	1,58	0,01	-	6543,5	0,35	0,693
11. The other team members contributed to the group	112	1,71	120	1,74	0,04	‘+’	6704,5	-0,03	0,973
12. The facilitator determined if the members of the group had reached consensus before moving on to the next point	112	2,26	120	1,98	-0,28	-	5664,0	2,07	0,03
13. Group members were sensitive to my feelings	110	2,32	119	2,00	-0,32	-	5604,5	1,88	0,049
14. The group members participated to the best of their ability	112	1,85	120	1,78	-0,07	-	6527,0	0,37	0,686



	Valid N - Time 1	Mean - Time 1	Valid N - Time 3	Mean - Time 3	Shift in Mean	Shift wanted	U	Z	p-value
15. People pushed their own views without trying to explain them to the others	112	3,83	120	3,97	0,14	'+'	6300,0	-0,82	0,388
16. Group members were encouraged to ask questions	110	2,26	120	2,13	-0,13	-	6082,0	1,03	0,283
17. The group was able to structure the session	111	2,22	120	1,93	-0,29	-	555,5	2,18	0,022
18. We checked our progress and were able to complete the task in the allotted time	111	2,48	120	1,73	-0,74	-	4142,5	4,96	0,000
19. People constantly interrupted me and I was unable to make my point	112	4,04	120	4,22	0,18	'+'	6230,0	-0,96	0,300
20. The facilitator was able to take the discussions from various group members and make sense of them on the board	112	2,01	120	2,03	0,02	-	6640,5	-0,16	0,869

Table B.5: Group processing at time 1 and time 3



Group C had two African students who were dominated by the overwhelming majority of White students in the group during the first session. During the second session the observer noted that there seemed to be two groups of students. The one group tended to participate actively and lead the session. The second group only sought clarification from the first group or validated what had been offered by them. The same members who had been reluctant to participate in the first session, only partook occasionally in the last.

The only comment the observer made about **Group D** during the first session was that there was some domination of the group by some of the members. He found that this had turned around during the second session. The minorities seemed to play a leading role. One of the females in particular made an excellent facilitator and was able to clarify what was happening to the others. When another facilitator took over there were still two members who tended to dominate the discussion and participation.

It would seem from these observations that there had been some improvement from the first to the third session. The groups were more cohesive and participation was improved but there was still a problem with the domination of some team members over others. Some of the groups did have students in them who were only doing IS1 and this might have exacerbated the situation.

B.4.3 Assessment of students' learning - Case Study 4

The students were given a pre-test on the use ER diagrams and the examination served as a post test. This year the students had covered the work on ER diagrams before the pre-test so it was possible to compare these results. The students tend to have more difficulty with ER diagrams than use-case diagrams - as shown by their average mark, which was only around 50% in the pre-test. More time is also spent doing ER diagrams than the use-case diagrams in the JAD sessions. The examination question was felt to be more difficult than the test question by the lecturers in Information Systems 2, but the marks improved anyway.

Once again, it must be remembered that no effort was made to stop the students from doing any extra studying as this was felt to be unethical and not in line with the attempt to study the method in context. This should be kept in mind when looking at these results.

As the students marks were known the values could be matched and it was possible to do a t-test and a regression analysis of the marks.

Table B.6 gives the results of the t-test done on the dependent samples.

	Mean	Std Dev	N	Diff	Std Dev Diff	t	df	p-value
PRE%	50,122	20,172	108					
POST%	58,873	15,757	108	-8,752	20,346	-4,470	107	1,95E05

Table B.6: T-test results for marks for Use-Cases

All the criteria for a t-test are satisfied and the p-value is once again extremely low (1,95E-05) - although not as low as the previous year. This indicates that the difference between the means of the pre- and post-test cannot be attributed to chance.

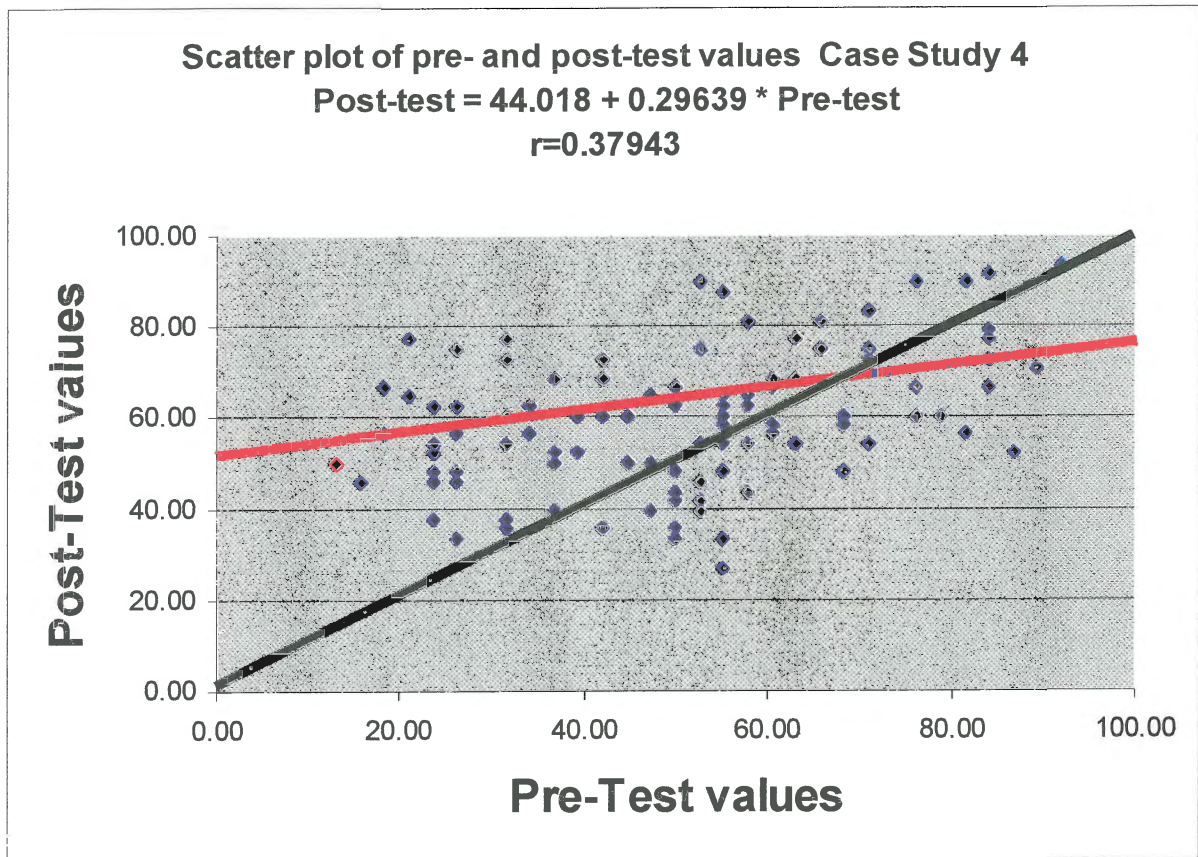


Figure B.2: Scatter Plot showing pre- and post-test results - Case Study 4

The scatter plot, shown in Figure B.2 shows that there was a general improvement in marks. The straight, red line shows the line for the regression analysis. The formula for the regression line is $\text{post-test}\% = 44,018 + 2,9639 * \text{pre-test}\%$. The correlation value is $r=0,37943$. The black line shows where the students would have lain if their marks had stayed the same for the two tests. Those above the line improved their marks and those below the line did worse. As one can see, the method seems to have been more effective for those in the low to medium range, rather than those whose

scores were high to start with. It was especially effective for those whose scores were very low.

This ends the discussion of the results of each of the individual case studies. Some of the quantitative results are available in Tables in Section B.5 where the four case studies results can be compared. There were some small differences in the questionnaires used and these are described with the tables.

B.5 TABLES OF COMPARATIVE RESULTS ACROSS CASE STUDIES

The following sections give some of the quantitative results for the four case studies.

B.5.1 Group composition - comparative

	In which classgroup are you?		What is your home language?		What gender are you?		What race are you?	
Case Study 1	Business	77,3%	English	44,0%				
	Technical	22,7%	Afrikaans	36,0%				
			Xhosa	14,7%				
			Other	5,3%				
Case Study 2	Business	66,6%	English	57,5%	Male	69,0%	African	16,3%
	Technical	33,3%	Afrikaans	26,4%	Female	31,0%	Coloured	12,8%
			Xhosa	13,8%			White	66,3%
			Other	2,3%			Asian	4,6%
Case Study 3	E.London	36,1%	English	3,3%	Male	21,3%	African	96,8%
	Pottsdam	63,9%	Afrikaans	0,0%	Female	78,7%	Coloured	1,6%
			Xhosa	91,8%			White	0,0%
			Other	4,9%			Asian	1,6%
Case Study 4	Business	40,2%	English	44,4%	Male	66,7%	African	26,1%
	Technical	59,8%	Afrikaans	30,8%	Female	33,3%	Coloured	10,4%
			Xhosa	21,4%			White	60%
			Other	3,4%			Asian	3,5%

Table B.7: Comparison of composition of students across four case studies

B.5.2 Experiences of working in groups - comparative

		Did you enjoy working in groups?	When you were a member of the group and not the facilitator, did you feel that the facilitators gave you a chance to have your say?	Did you feel that you were able to contribute to the group?	Did you feel that all group members made contributions to the group?	Did you feel that you were accepted as a group member?
Case Study 1	Always	24,3%	28,4%	21,6%	6,7%	54,7%
	Mostly	68,9%	66,2%	68,9%	61,3%	38,7%
	Seldom	6,8%	2,7%	9,5%	26,7%	6,7%
	Never	0,0%	2,7%	0,0%	5,3%	0,0%
Case Study 2	Always	25,2%	40,7%	44,7%	17,4%	71%
	Mostly	64,4%	51,2%	48,2%	66,3%	22,1%
	Seldom	9,2%	8,1%	7,1%	16,3%	5,8%
	Never	1,1%	0,0%	0,0%	0,0%	1,2%
Case Study 3	Always	61,4%	70%	65%	55,2%	88,3%
	Mostly	29,8%	30%	35%	41,4%	11,7%
	Seldom	7%	0,0%	0,0%	1,7%	0,0%
	Never	1,8%	0,0%	0,0%	1,7%	0,0%
Case Study 4	Always	26,5%	52,1%	49,5%	17,2%	83,5%
	Mostly	65%	44,4%	47,0%	69,8%	16,5%
	Seldom	8,5%	2,6%	3,5%	12,9%	0,0%
	Never	0,0%	0,9%	0,0%	0,0%	0,0%

Table B.8: Comparison of group experiences over the four case studies

Note that the first question changed from Case Study 1 to the rest. In Case Studies 2, 3 and 4, the question was 'How did you experience working in groups?' and the answers were 'Enjoyed it a lot, Mostly enjoyed it, Enjoyed it seldom, Never enjoyed it'. The sentiments were the same, however.

B.5.3 Learning in groups - comparative

		Do you feel that the JAD techniques used in the classroom are effective in helping you to learn?	Do you feel that the JAD technique has helped you to learn how to feel more confident about how to act within a group?	Do you feel that the JAD technique has helped you to learn to interact with people?	Do you feel that the JAD technique has helped you to learn how to speak in front of small groups of people?
Case Study 1	Always	32,0%			
	Most of time	56,0%			
	Very Seldom	9,3%			
	Never	2,7%			
Case Study 2	Knew already	3,5%	18,6%	26,7%	22,1%
	Helped a lot	60,5%	48,8%	36,0%	46,5%
	Helped a little	32,5%	26,7%	31,4%	26,7%
	No help at all	3,5%	5,8%	5,8%	4,7%
Case Study 3	Knew already	6,9%	14,3%	16,7%	24,1%
	Helped a lot	91,4%	82,1%	77,8%	72,4%
	Helped a little	1,7%	3,6%	5,6%	3,5%
	No help at all	0,0%	0,0%	0,0%	0,0%
Case Study 4	Knew already	6,1%	21,4%	20,0%	27,2%
	Helped a lot	63,2%	58,1%	49,6%	42,1%
	Helped a little	29,8%	19,7%	27,8%	29,8%
	No help at all	0,9%	2,6%	2,6%	0,9%

Table B.9: Comparison of learning in groups across the case studies

The students were asked various questions about their learning in groups. During the first case study, they were not given the option of saying that they already knew the skill and they were given four other options as indicated in Table B.7. Not all of the questions were asked in Case Study 1.

B.5.4 Facilitation and language - comparative

	How did you experience being the JAD facilitator?		When you were working in your JAD groups, were you able to communicate in your home language?	
Case Study 1	Enjoyed it a lot	19,1%	Always	35,7%
	Enjoyed it mostly	54,4%	Most of the time	18,6%
	Enjoyed it seldom	20,6%	Very seldom	18,6%
	Did not enjoy at all	5,9%	Never	27,1%
Case Study 2	Enjoyed it a lot	19,8%	Always	55,3%
	Enjoyed it mostly	65,1%	Most of the time	8,2%
	Not enjoy mostly	11,6%	Very seldom	5,9%
	Did not enjoy at all	3,5%	Never	30,6%
Case Study 3	Enjoyed it a lot	70,7%	Always	30,4%
	Enjoyed it mostly	25,9%	Most of the time	35,7%
	Not enjoy mostly	3,4%	Very seldom	21,4%
	Did not enjoy at all	0,0%	Never	12,5%
Case Study 4	Enjoyed it a lot	28,7%	Always	39,1%
	Enjoyed it mostly	55,7%	Most of the time	13,9%
	Not enjoy mostly	13,9%	Very seldom	17,4%
	Did not enjoy at all	1,7%	Never	29,6%

Table B.10: Facilitation and Language - comparison across the case studies

B.5.5 Use of JAD - comparative

	Do you think that the modelling techniques that you have learnt this year will be useful in industry?		What method of learning the modelling techniques do you prefer?	
Case Study 1	Very useful	39,7%	Working in groups on white board	82,2%
	Somewhat useful	55,9%	No preference	15,1%
	Seldom useful	2,9%	Working in groups without white board	2,7%
	Not used at all	1,5%		
Case Study 2	Very useful	57,5%	Working in groups using JAD techniques	76,2%
	Somewhat useful	36,8%	Working in groups on paper without using JAD	8,3%
	Seldom useful	5,7%	Working individually	15,5%
	Not used at all	0%		
Case Study 3	Very useful	77%	Working in groups using JAD techniques	86%
	Somewhat useful	21,3%	Working in groups on paper without using JAD	7%
	Seldom useful	1,7%	Working individually	7%
	Not used at all	0,0%		
Case Study 4	Very useful	53,5%	Working in groups using JAD techniques	72,8%
	Somewhat useful	43,9%	Working in groups on paper without using JAD	13,6%
	Seldom useful	2,6%	Working individually	13,6%
	Not used at all	0,0%		

Table B.11: Usefulness of JAD - comparison across the case studies

The question and answers on what method of learning they preferred was slightly different in Case Study 1 from the other case studies. The question was "*At the beginning of the semester, there was only one white board in the classroom and you had to work in normal groups, which method did you prefer?*"