

Interactive Qualitative Analysis – A Novel Methodology for Qualitative Research

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Abstract

This study investigates the use of Interactive Qualitative Analysis (IQA) (Northcutt & McCoy, 2004), as a methodology, to develop an understanding of how Managerial Accounting and Financial Management students experienced learning in a writing intensive tutorial programme. IQA is an innovative methodology providing a structured approach to conducting qualitative research. Participants or constituents are actively engaged in data collection and analysis. Using thematic content analysis of the data, they articulate their experiences of the phenomenon and identify emergent themes, or affinities and the relationship between the affinities. The outcome of the IQA process is a Systems Influence Diagram, a visual representation of the phenomenon, constructed through the lens of the constituents. What sets IQA apart from other forms of qualitative inquiry is that it provides an audit trail of transparent and traceable procedures where the constituents, and not the researcher as expert, do the analysis and interpretation of their data. The analysis of the data is as far as possible free from researcher bias as the researcher is merely a facilitator of the process. The key value of this paper is that it offers a practical methodological approach to using IQA in qualitative accounting education research, in particular, and business management education research, in general.

Keywords: affinities; constituents; Interactive Qualitative Analysis; qualitative research; Systems Influence Diagram

1. Introduction

Qualitative research is an inquiry process aimed at understanding social or human problems based in a natural setting. With qualitative research there are multiple perspectives of reality, which are subjective and open to researcher bias as the researcher actively participates in the research process and analyses the data and in so doing builds an understanding of a complex set of processes while reporting on the views of participants (Creswell 1994, p. 1,2). This process raises issues related to lack of rigour, trustworthiness and reliability (Creswell, 2009; Denzin & Lincoln, 1998a, 1998b) which beset qualitative research. Interactive Qualitative Analysis (IQA) (Northcutt & McCoy, 2004) is an innovative approach to qualitative research, which seeks to minimise the power relations and biases traditionally associated with qualitative research (Paz Dennen, 2005; Tabane & Human-Vogel, 2010). With IQA, participants are actively engaged in collecting and analysing the data. The outcome of the IQA process is a System Influence Diagram (SID), which is "a visual representation of a phenomenon prepared according to rigorous and replicable rules for the purpose of achieving complexity, simplicity, comprehensiveness and interpretability" (Northcutt & McCoy 2004, p. 41).

The value of this paper lies in offering a practical methodological approach to using IQA in a qualitative accounting education study exploring Managerial Accounting and Financial Management (MAFM) students' experiences of learning in a writing intensive tutorial (WIT) programme. The detailed description of the IQA methodology process presented in this study could be applied to other studies in areas of business management research.

The remainder of this paper is structured as follows: IQA as a qualitative research design method is considered followed by a discussion of the ideology of IQA. Thereafter, the IQA process is described using MAFM students' experiences of learning in a WIT programme as an illustrative example. The final section concludes the paper.

2. Interactive Qualitative Analysis

IQA (Northcutt & McCoy, 2004) is a structured approach to qualitative research design (du Preez & du Preez, 2012; Mampane & Bouwer, 2011; Northcutt & McCoy, 2004). IQA uses focus groups to produce a systematic representation of a phenomenon from participants' experiences of the phenomenon being studied. IQA is based on the premise that those

closest to the phenomenon being studied, the participants or *constituents* in IQA terminology, are best suited to construct a graphic representation of the systems' influences and outcomes. In the early stages of analysis, constituents' voices are privileged over that of the researcher. Constituents are defined as "a group of people who have a shared understanding of the phenomenon" (Northcutt & McCoy 2004, p. 44), and are selected on the basis of their power over and distance from (closeness to) the phenomenon under investigation. With traditional qualitative research, the researcher generates the themes: however, with IQA, the constituents are responsible for the open coding of the data and generating themes or affinities.

IQA as a research design is consistent with the principles of social constructivism because it "privileges the nature of socially constructed meaning" (Northcutt & McCoy 2004, p. 4). It allows the group to construct categories of meaning, *affinities*, and the role of the researcher is that of facilitator. The affinities provide the protocol for individual semi-structured interviews where constituents' experiences of the phenomenon can be further explored. An Interrelationship Diagram (IRD) is developed portraying the cause and effect, or influence between affinities. A Systems Influence Diagram (SID) is the final outcome. Northcutt and McCoy (2004, p.41) state: "The product of an IQA study is a visual representation of a phenomenon prepared according to rigorous and replicable rules for the purpose of achieving complexity, simplicity, comprehensiveness and interpretability."

In the collection and analysis of data, constituents articulate their experiences of the phenomenon and develop affinities in focus groups thus meaning is socially constructed. This process effectively reduces issues of trustworthiness, dependability and conformability (Tabane, 2010). The role of the researcher is that of facilitator of the process, minimising the researcher's power and influence over constituents during data analysis. "The researcher's role then moves from designer to facilitator, teaching the group members the process and guiding them to generate and analyze their own data with minimal external influence." (Northcutt & McCoy 2004, p. 44). Consequently, the researcher's biases and prejudices are minimised in the process.

3. The Ideology of IQA

In this section, the ontological and epistemological assumptions as they inform the research method and design (Cohen, Manion & Morrison 2007, p. 8 - 20) are described.

3.1 Ontological perspective

"IQA presumes that *knowledge and power* are largely *dependent*" (Northcutt & McCoy 2004, p. 16). The constituents are selected because they hold the power and knowledge (which are inextricably linked) of the phenomenon being studied through their membership of a particular group. In this study, constituents were selected due to their membership of the WIT programme which provided them with authority to reflect on their experience of learning in that programme.

"IQA presumes that the *observer and the observed* are *dependent* or ... *interdependent*" (Northcutt & McCoy 2004, p. 16). IQA challenges the traditional assumptions of qualitative research which suggest that the role of participants is to generate data, which only the researcher is qualified to analyse. With IQA, constituents generate and interpret their own data while the researcher facilitates the process.

"The *object of research* in IQA is clearly *reality in consciousness*" (Northcutt & McCoy 2004, p. 16). The selection of constituents is made from among those closest to the phenomenon, and in this study, students who participated in the WIT programme. Data collection is undertaken in focus groups thus reality is socially constructed by members of the group. Follow-up interviews are used to further probe individual meanings of the constructs. The central construct of this study was learning, and the focus group format provided constituents with the opportunity to chronicle the processes by which they learned MAFM in the WIT programme.

3.2 Epistemological perspective

"IQA insists that *both deduction and induction* are necessary to the investigation of meaning (Northcutt & McCoy 2004, p. 16). In IQA, categories of meaning or affinities are socially constructed by constituents in focus groups through induction. Affinities are then defined and refined by the constituents (induction and deduction). In the final step, participants deductively explore the relationship between constructs. The IQA process of coding corresponds with the traditional classes of the analysis of coding – emergent, axial and theoretical (Northcutt & McCoy 2004, p. 16).

"IQA contends that *decontextualized* descriptions are useful and possible as long as they are backed up or grounded ... by highly contextualized ones" (Northcutt & McCoy 2004, p. 17). The researcher aids the reader by providing

the context within which the research was conducted. Northcutt and McCoy (2004) refer to the Denzin and Lincoln (1998a, p. 3) metaphor of the *bricoleur* as quilt maker. With IQA, the group, create their own interpretive quilt of meaning or *bricolage*.

"IQA is clearly *favorable to theory*, both from the point of view of inducing theory and of testing it." (Northcutt & McCoy 2004, p. 17). The outcome of IQA is a mindmap of a group's or an individual's mental models of a particular phenomenon. The relationship between constructs can then be theorised. The voices of those closest to the phenomenon, constituents on the WIT programme, are privileged over that of the researcher.

4. The IQA Process

The first phase of the IQA entails the selection of constituents to participate in the study, focus group interviews, and generation of a composite visual representation of the phenomenon. The second phase of data collection is semi-structured interviews to further probe the constituents' experiences of affinities developed in the focus groups and subsequently theorise the relationships. Due to length constraints, this phase of the IQA process is not described in this paper.

4.1 Identifying constituents

Constituents are selected according to the criteria of "distance and power" (Northcutt & McCoy 2004, p. 69) in relation to the phenomenon being studied. Constituents for this study were a purposive sample of 15 MAFM students who voluntarily participated in an 18-week WIT programme. They shared a direct and common experience of the phenomenon, and in focus group sessions actively engaged in generating the data, coding it and eliciting affinities or themes.

4.2 Focus group sessions

During the focus group phase of the IQA process, constituents' experiences of the WIT programme were probed using silent brainstorming for data generation. Constituents shared common perceptions of the WIT programme, however, each constituent perceived the experience in different ways.

At the commencement of the focus groups, constituents were asked to relax, make themselves comfortable, close their eyes, take a few deep breaths and clear their minds. They were then asked to silently reflect on their experiences of learning in the WIT programme. In order to initiate reflection, an issue statement was provided by the facilitator. An issue statement is "used to deconstruct and operationalise the research question" (Mampane & Bouwer 2011, p. 117). After a brief discussion of the issue statement, constituents spent about 10 minutes silently reflecting on their experiences and then wrote their reflections on Post-its. There was no limit to the number of Post-its each constituent could write, however, there must be only one thought, experience or, word, per Post-it. Brainstorming is conducted in silence to eliminate the influence of dominant members of the group. The facilitator is there to provide a safe environment to guide the process and encourage constituents to write without censoring their thoughts, until they have exhausted their ideas (Northcutt & McCoy 2004, p. 69). Once everyone has finished writing, Post-its are affixed randomly on a wall.

4.2.1 Affinity analysis

Once the brainstorming is complete, then the analysis of the data generated commences. In the *clarification stage*, constituents are asked to begin by silently reading the Post-its which have been affixed to a wall. The facilitator then reads each Post-it aloud to ensure that constituents understand what is written and to clarify if required.

4.2.2 Inductive coding

In the *clustering stage*, constituents arranged the Post-its in sets with common meanings. This continues until consensus is reached with the placement of Post-its into affinity groupings yielding a collective view. Again this process should be conducted silently to prevent dominant individuals or the facilitator monopolizing the process.

4.2.3 Axial coding

Constituents then reviewed the Post-its under each grouping to ensure that they were under the correct themes. A Post-it was placed at the top of each thematic grouping naming it. A limited amount of refining of Post-its was required to ensure that all of the Post-its were correctly categorised into the relevant affinity. Affinities produced by each group were aggregated and nine common affinities emerged. The nine affinities identified were: challenging; critique; enjoyable; interactive; personal confidence, positive structure; study technique and test preparation; understanding; and written tasks.

The IQA focus group process takes between three and four hours to complete (Lin & Tu, n.d.), which can be a disadvantage of the IQA process if constituents do not have that length of time available (Lodewyckx, 2005). Once affinities have been identified, a detailed affinity relationship table is constructed.

4.3 Detailed Affinity Relationship Table

An Affinity Relationship Table (ART) is completed by constituents to record an analysis of each pair of affinity relationships. The relationship can be one of three,

- Understanding → interaction (*understanding* influences *interaction*)
- Understanding ← interaction (*interaction* influences *understanding*)
- Understanding < > interaction (no relationship between the affinities)

Further, constituents are asked to write a hypothesis “that reflects their experiences and that supports the cause and effect relationship” (Northcutt & McCoy 2004, p. 152) between affinity pairs. This could be in the form of a short ‘if-then’ statement. The responses are taken at face value as the true meaning of how constituents conceptualised the affinity relationships (Human-Vogel 2006, p. 619).

The ART can be completed individually or in dyads or triads. In this study, seven constituents chose to complete it individually and eight chose to do it with a friend, resulting in four dyads. The dyads took much longer to complete than the individuals as they had to reach consensus on the direction of the arrows. The majority of the constituents took far longer to complete the exercise than the facilitator had anticipated – more than 45 minutes. It is suggested that a sufficient block of time is set aside to complete the exercise.

With IQA it is possible to analyse the ART at either a group composite level or an individual level to create the IRD. In this study, relationships were analysed on a group level to determine the group’s composite understanding of the phenomenon (Human-Vogel & Mahlangu, 2009). Pareto protocol is a statistical method that was used to determine the optimal number of relationships to comprise the IRD. It is based on the fundamental principle that “A minority of the relationships in any system will account for a majority of the variation within the system.” (Northcutt & McCoy 2004, p. 157). This optimum number of relationships will be at the point where *power* reaches a maximum. Using individual and dyad ARTs, each relationship frequency is tallied, entered on a spreadsheet and the total number of votes for each relationship calculated. A total of 344 votes were cast for all combinations of affinity pairs. The outcome of the process is the frequency of each relationship in affinity pair order – see Annexure I. An appraisal of Annexure I indicates that comparatively few of the possible 72 relationships account for most of the variance, consistent with the Pareto principle. Figure 1 is an illustration of the variance accounted for by each succeeding relationship.

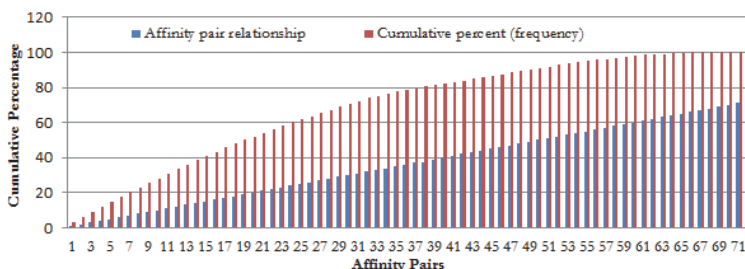


Figure 1: Cumulative percent – total relationships

As shown in Figure 2, power reaches a maximum (29.683) at 32 relationships which accounts for 74.128% of the

variation in this system (Annexure I). Accordingly the first 32 affinity relationships will be included in the group IRD.

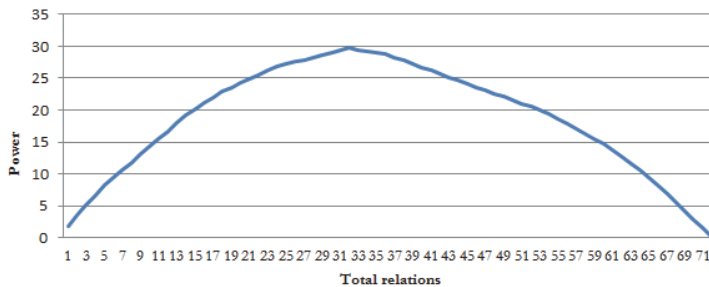


Figure 2: Cumulative percentage – total relationships

When deciding which relationships to include or exclude from the composite group IRD, the last two columns of the Pareto table are pivotal in determining where to set the cut-off point as relationships are displayed in decreasing order of frequency. Relationships 67 to 72 (Annexure I) are excluded as they failed to attract a single vote. However the decision still needs to be made whether, in the composite IRD, to account for relationships such as those between 55 and 66 which attracted one or two votes. The elegance of the IQA is based on the trade-off between accounting “for maximum variation in the system ... while minimizing the number of relationships in the interest of parsimony” (Northcutt & McCoy 2004, p. 160).

4.4 Creating a group composite: the Inter Relationship Diagram

The IRD is created from the first 32 affinity pair relationships (Annexure I), and this is the first step in rationalising the system (Northcutt & McCoy 2004, p. 170). Each affinity relationship is mapped to create the composite IRD. The direction of the arrow in each affinity pairing determines which affinity is influenced by which. Up arrows represent the row driving the column and left arrows represent the column driving the row. For example, the first affinity pairing, 2 → 6 signifies that affinity 2 (understanding), *cause*, is influencing affinity 6 (enjoyment), *effect*. The IRD works on a similar principle to double-entry booking as every affinity will have ‘two entries’ in the tabular IRD and the ‘outs’ and ‘ins’ need to balance with the number of affinity relationship pairs (32). Thus affinity 2 will have ↑ (out) into affinity 6 and the balancing entry will be ← (in) to affinity 2 from affinity 6 (Table 1). Delta (Δ) is the difference between the ‘outs’ and ‘ins’ for each affinity.

Table 1: Composite focus group IRD - sorted in descending order

*	1	2	3	4	5	6	7	8	9	out↑	in←	Δ
1		↑	↑	↑	↑	↑	↑	↑	←	7	1	6
2	←		↑	←	↑	↑	↑	↑	↑	6	2	4
4	←	↑	←		↑	↑	↑	↑	↑	6	2	4
3	←	←		↑	↑	↑	↑			4	2	2
9	↑	←		←	↑			←		2	3	-1
5	←	←	←	←		↑	↑	↑	←	3	5	-2
6	←	←	←	←	←		↑	↑		2	5	-3
7	←	←	←	←	←	←		↑		1	6	-5
8	←	←	←	←	←	←	←		↑	1	6	-5

*Affinities: 1 – positive structure; 2 – understanding; 3 – written tasks; 4 – challenging; 5 – study technique and test preparation; 6 – enjoyment; 7 – personal confidence; 8 – interaction; 9 – critique

The IRD provided the data needed to determine which affinities were drivers or outcomes. Affinities with positive deltas (1, 2, 4, 3) are drivers or causes and affinities with negative deltas (9, 5, 6, 7, 8) are outcomes or effects. Positive structure (1) is the primary driver of the system and personal confidence (7) and interaction (8) are primary outcomes. This classification is indicative of a strong cause or effect relationship between relevant affinities. Understanding (2), challenging (4) and written tasks (3) are secondary drivers and critique (9), study technique and test preparation (5) and

enjoyment (6) are secondary outcomes.

4.5 Focus group Systems Influence Diagram (SID)

4.5.1 Cluttered SID

The aggregated focus group data is utilised in drawing the SID. The SID is a visual representation of all relationships of the entire system (Northcutt & McCoy 2004, p. 174). When drawing the SID primary drivers are placed on the extreme left-hand side and primary outcomes on the extreme right-hand side. Secondary outcomes and drivers are placed between primary drivers and outcomes with drivers placed on the left and outcomes on the right. For every relationship in the IRD (Table 1) an arrow is drawn between the two affinities indicating the direction of cause and effect the product of which is the cluttered SID, see Figure 3. The cluttered SID has limited explanatory value as it is too complex for meaningful analysis. For the SID to have relevance it is a precondition that it be uncluttered by removing redundant links.

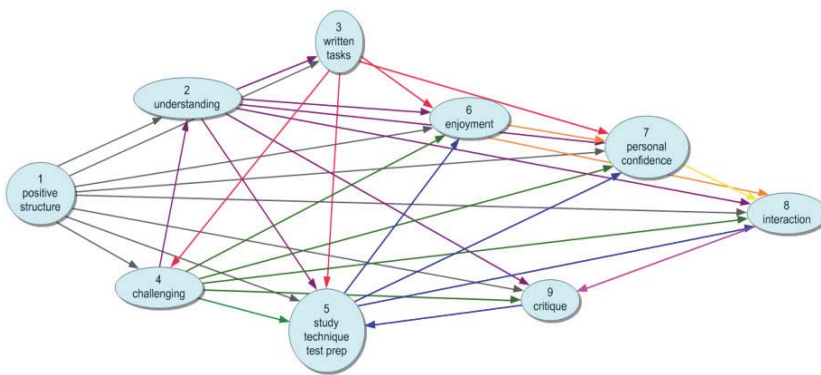


Figure 3: Cluttered SID

4.5.2 Uncluttered SID

Once the relationships are examined all redundant links are removed to simplify the diagram, resulting in an uncluttered SID. In the cluttered SID (Figure 3), 1 → 3 would be considered a redundant link because 1 → 2 and 2 → 3, hence the link 1 → 3 can be removed making the system simpler and one that has optimum explanatory power (Northcutt & McCoy, 2004, p. 177). The process of removing redundant links continued until all had been removed and the resultant uncluttered SID represents MAFM students' experiences of learning in a WIT programme. Figure 4 shows the uncluttered SID.

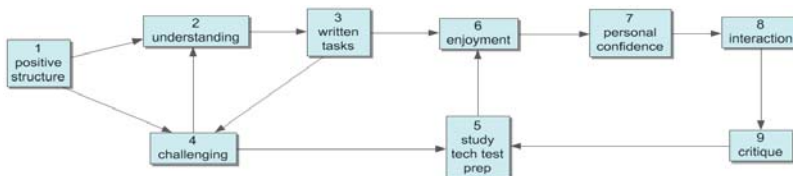


Figure 4: Uncluttered SID

4.6 A tour through the system

Looking at the uncluttered SID represented in Figure 4, the following interpretation can be offered. Learning experiences of MAFM students in a WIT programme are driven by the structure of the programme and this influences students' understanding and the challenging nature of the tasks completed. Improved understanding influences the written tasks,

which in turn influences the challenging nature of the programme and this influences understanding of MAFM. These three elements form a feedback loop. Written tasks influence enjoyment and the challenging nature influences study technique and test preparation. The enjoyment affinity influences personal confidence which influences interaction and this influences critique, which influences studying technique and test preparation. Another feedback loop is formed between affinities 6, 7, 8, 9 and 5. The outcome of the system is representative of the interactive nature of the WIT programme.

4.7 Feedback loops and zooming

Within the system two feedback loops were identified:

- understanding, written tasks challenging, enjoyment; and
- personal confidence, interaction, critique and study technique and test preparation.

Northcutt and McCoy (2004, p. 335) state that a feedback loop consists of at "least three affinities, each influencing the other directly or indirectly". Feedback loops can be renamed by reviewing the components of each subsystem. The process is referred to as "zooming" (Northcutt & McCoy 2004, p. 335). The substitute name for subsystems is generated by reviewing the axial coding and descriptions together with the placements of the feedback loops within the overall system. The defined components of the first subsystem (2, 3, 4) suggest *intellectually stimulating*. The defined components of the second subsystem (6, 7, 8, 9, 5) suggest *learning is fun*. These new "superaffinities" replace the feedback loops via substitution in a new view that is zoomed out (Northcutt & McCoy 2004, p. 335) (see Figure 5).



Figure 5: WIT learning experience telephoto view SID

The new system is identical to the first (Figure 4) except that the seven affinities from the two feedback loops have been collapsed or zoomed out into more general terms – 'intellectually stimulating' and 'learning is fun'. This telephoto view SID cannot be zoomed any further and the result is an elegant linear system with no branching.

5. Conclusion

This paper discusses IQA as a research method, with application to a WIT programme. In this study, affinities were identified by constituents and presented in the ART from which relationships between affinities were described in the IRD. The culmination of the process (for this study) is the SID which is a visual representation of the system. So far as the researcher has determined, this is the first time IQA has been used in accounting education research.

The value in using IQA as a research design is that it scales back the power relations between researcher and participants. IQA ensures that the voice of the participants is valued and supplements the voice of the researcher. IQA is a complex procedure and if the entire process had been adhered to data collection would have extended beyond the duration of the WIT programme. IQA also imposes time demands on participant subjects. However, using the principles of IQA, the context determines how far the theory can be applied.

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Annexure I: Affinities in descending order of frequency with Pareto protocol and power

No	Affinity pair relationship	Frequency sorted (descending)	Cumulative frequency	Cumulative percent (relation)	Cumulative percent (frequency)	Power
1	2 → 6	11	11	1.389	3.198	1.809
2	1 → 8	11	22	2.778	6.395	3.618
3	2 → 7	10	32	4.167	9.302	5.136
4	2 → 3	10	42	5.556	12.209	6.654
5	1 → 2	10	52	6.944	15.116	8.172
6	4 → 8	9	61	8.333	17.733	9.399
7	4 → 5	9	70	9.722	20.349	10.627
8	3 → 7	9	79	11.111	22.965	11.854
9	3 → 6	9	88	12.500	25.581	13.081
10	2 ← 4	9	97	13.889	28.198	14.309
11	1 → 6	9	106	15.278	30.814	15.536
12	1 → 5	9	115	16.667	33.430	16.764
13	1 → 4	9	124	18.056	36.047	17.991
14	1 → 3	9	133	19.444	38.663	19.218
15	7 → 8	8	141	20.833	40.988	20.155
16	4 → 7	8	149	22.222	43.314	21.092
17	3 → 5	8	157	23.611	45.640	22.028
18	3 → 4	8	165	25.000	47.965	22.965
19	6 → 8	7	172	26.389	50.000	23.611
20	4 → 9	7	179	27.778	52.035	24.257
21	4 → 6	7	186	29.167	54.070	24.903
22	2 → 9	7	193	30.556	56.105	25.549
23	2 → 8	7	200	31.944	58.140	26.195
24	1 → 7	7	207	33.333	60.174	26.841
25	8 → 9	6	213	34.722	61.919	27.196
26	6 → 7	6	219	36.111	63.663	27.552
27	5 ← 9	6	225	37.500	65.407	27.907
28	5 → 8	6	231	38.889	67.151	28.262
29	5 → 7	6	237	40.278	68.895	28.618
30	5 → 6	6	243	41.667	70.640	28.973
31	1 ← 9	6	249	43.056	72.384	29.328
32	2 → 5	6	255	44.444	74.128	29.683
33	2 ← 5	4	259	45.833	75.291	29.457
34	6 ← 8	4	263	47.222	76.453	29.231
35	3 → 9	4	267	48.611	77.616	29.005
36	7 ← 9	4	271	50.000	78.779	28.779
37	7 ← 8	3	274	51.389	79.651	28.262
38	7 → 9	3	277	52.778	80.523	27.745
39	6 ← 9	3	280	54.167	81.395	27.229
40	5 ← 8	3	283	55.556	82.267	26.712

41	5 ← 7	3	286	56.944	83.140	26.195
42	5 ← 6	3	289	58.333	84.012	25.678
43	5 → 9	3	292	59.722	84.884	25.161
44	4 ← 9	3	295	61.111	85.756	24.645
45	4 ← 5	3	298	62.500	86.628	24.128
46	3 ← 9	3	301	63.889	87.500	23.611
47	3 ← 7	3	304	65.278	88.372	23.094
48	3 ← 5	3	307	66.667	89.244	22.578
49	3 → 8	3	310	68.056	90.116	22.061
50	2 ← 8	3	313	69.444	90.988	21.544
51	2 → 4	3	316	70.833	91.860	21.027
52	1 ← 5	3	319	72.222	92.733	20.510
53	1 → 9	3	322	73.611	93.605	19.994
54	8 ← 9	3	325	75.000	94.477	19.477
55	6 ← 7	2	327	76.389	95.058	18.669
56	4 ← 6	2	329	77.778	95.640	17.862
57	3 ← 4	2	331	79.167	96.221	17.054
58	2 → 3	2	333	80.556	96.802	16.247
59	1 → 2	2	335	81.944	97.384	15.439
60	2 ← 7	2	337	83.333	97.965	14.632
61	6 → 9	2	339	84.722	98.547	13.824
62	4 ← 8	1	340	86.111	98.837	12.726
63	3 ← 8	1	341	87.500	99.128	11.628
64	2 ← 9	1	342	88.889	99.419	10.530
65	1 ← 7	1	343	90.278	99.709	9.432
66	1 ← 4	1	344	91.667	100.000	8.333
67	4 ← 7	0	344	93.056	100.000	6.944
68	3 ← 6	0	344	94.444	100.000	5.556
69	2 ← 6	0	344	95.833	100.000	4.167
70	1 ← 8	0	344	97.222	100.000	2.778
71	1 ← 6	0	344	98.611	100.000	1.389
72	1 ← 3	0	344	100.000	100.000	0.000