

Double, Double Toil and Trouble: Using Interactive Qualitative Analysis to Understand Non-Major Accounting Students' Learning

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Received: January 12, 2022

Accepted: February 20, 2022

Online Published: February 24, 2022

doi:10.5430/ijhe.v11n4p136

URL: <https://doi.org/10.5430/ijhe.v11n4p136>

Abstract

This study investigates the implementation of the methodology, Interactive Qualitative Analysis (IQA) (Northcutt & McCoy, 2004) during the COVID-19 pandemic, to understand how non-major accounting students learn Accounting 101 in a threshold concepts-inspired tutorial programme. Even though IQA is a predominantly qualitative method, it incorporates quantitative data with qualitative data systematically. These data collection and data analysis procedures are a means of aiding participants in a focus group to describe their experiences with a phenomenon, to name these experiences and to then describe the relationships between these named experiences. The objective of the IQA methodology is to create a picture, a Systems Influence Diagram (SID), representative of the mind map of the focus group participants, with regard to the phenomenon outlined in the issue statements. A summary of theoretical codes used to capture the relationships between affinities named, an Inter Relationship Diagram (IRD), is used to draw the SID. IQA requires the researcher to document each step of the research process, whilst acting as a facilitator by teaching the participants the IQA process on how to generate and analyse the data that they have generated, thereby minimising the researcher influence. This study provides qualitative research conducted in the fields of education and accounting, with a qualitative methodological approach, being Interactive Qualitative Analysis (IQA).

Keywords: Non-major accounting students, Interactive Qualitative Analysis, Affinities, Systems Influence Diagram, Threshold Concepts Tutorial Programme, Conceptual and Emotional Troublesomeness

1. Introduction

Accounting 101 classrooms at universities in South Africa typically consist of large class numbers with both major and non-major accounting students. Students who major in the discipline of accounting have elected to study accounting and qualify as chartered accountants or a similar profession. Students who are not majoring in the discipline of accounting have had accounting imposed upon them as a compulsory discipline in their chosen programmes. Historically the pass rates and class averages in these classes are low both internationally (Hove et al., 2010; McGee et al., 2004) and in South Africa (Du Plessis et al., 2005).

The pedagogy, curriculum, assessment style and delivery of the accounting discipline, have been designed with the competencies required by the South African Institute of Chartered Accountants (SAICA). The challenge inherent in this mixed classroom was that as resources were limited, discipline experts were unable to provide non-major accounting students who do *not* want to become chartered accountants or those students who possessed an aversion to the discipline, with a design relevant to their specifications.

This challenge necessitated a deeper understanding of non-major accounting students' learning, as well as those students who possessed an aversion to the discipline, as their performance may contribute to the failure rate. This further necessitated the utilisation of possible innovative methods in order to assist students who do not wish to specialise in accounting in a South African context. The purpose of this study was to investigate the ways in which non-major accounting students experienced the learning of Accounting 101 in a tutorial programme based on the

Threshold Concepts Theory. This innovative method was used to attempt to assist students to overcome the conceptual as well as the emotional ‘*troublesomeness*’, one of the characteristics of the Threshold Concepts Theory, to their learning of Accounting 101, and to therefore *think like an accountant*, the purpose of the Threshold Concepts Theory. The main focus of this paper is not on the findings of the study, but rather on the methodology that was employed, being Interactive Qualitative Analysis (IQA). The research methodology that has been historically used in the discipline of accounting was that of a quantitative nature. This study used a relatively new qualitative methodology that emerged in 2004, namely that of Interactive Qualitative Analysis (IQA). The framework utilised was a theoretical framework called the Threshold Concepts Theory. It has been applied to the discipline of accounting internationally using predominantly semi-structured interviews. The IQA methodology implemented the use of not only semi-structured interviews, but a focus group session too. Other forms of data were used as a form of triangulation to confirm the findings of the study. The lacuna that this study aspired to fill will be using non-major accounting students with Interactive Qualitative Analysis (IQA) and the Threshold Concepts Theory that emerged in 2003.

2. Interactive Qualitative Analysis (IQA): Overview

2.1 Bricolage or Petit Point

The research methodology chosen, Interactive Qualitative Analysis (IQA), was used to analyse a semester’s worth of case studies that were held in the form of tutorial sessions. This methodology is housed in social constructivism as it “privileges the nature of socially constructed meaning” (Lucas, 2000; Northcutt & McCoy, 2004, p. 4). The purpose of qualitative research was to gain a deep understanding of human behaviour in its natural environment and the reasons for this behaviour. Qualitative research involved studying this human behaviour from the individual’s perspective and the meaning these individuals, or group of individuals, attributed to the human problem being investigated (Creswell & Creswell, 2017). The learning paradigm or world view that the Threshold Concepts Theory is located in is also social constructivism (Meyer, 2008, p. 151).

After an extensive search of which disciplines the IQA methodology has been applied to, it has been concluded that this will be the first time it will be applied in the discipline of accounting, using non-major accounting students more specifically. Having a background in the commerce field made using this methodology very user-friendly, as it comprehensively listed each step of the process. Even though IQA is a predominantly qualitative method, it incorporated quantitative data with qualitative data systematically (Bargate, 2015). This method was divided into two phases.

Phase One involved the use of a focus group to drive this phase. This type of group interview assisted to investigate participant’s knowledge and viewpoints and how and why they thought the way that they did (Kitzinger, 1995). The focus group identified affinities, or as Northcutt and McCoy termed it, “quilt pieces” regarding the phenomenon of the study. The participants then analysed the relationships amongst the affinities using an Affinity Relationship Table (ART). The relationships between the affinities were mapped to produce an Inter Relationship Diagram (IRD). The final product was a visual representation of each affinity pair relationship that had emerged, a Systems Influence Diagram (SID). This focus group was conducted upon the completion of the threshold concepts tutorial programme.

Phase Two involved conducting semi-structured interviews in order to validate the end product of Phase One, the Systems Influence Diagram. This phase confirmed the Systems Influence Diagram results and provided a deeper meaning of the affinities created. The semi-structured interviews followed the same informal tone set in the focus group. The participants were made to feel comfortable enough to respond freely as opposed to using a ‘yes’ or ‘no’ response to the set of questions (Longhurst, 2003, p. 105). The affinities identified in Phase One were used to formulate the interview questions and act as the codes used to analyse the interviews.

The bricolage metaphor described by Denzin and Lincoln in 2000, cautioned qualitative researchers against focusing on the detailed stitching of the individual patches, being affinities, and insisted rather that researchers focused on stitching the relationships between affinities, the individual patches together, to make an entire quilt with perhaps not as much detail. The objective of the IQA research study was to facilitate a focus group to create their own quilt and then to have each participant in the focus group create a separate quilt (Northcutt & McCoy, 2004, p. 43).

2.2 Identifying the Constituents

Northcutt and McCoy suggested that a focus group should ideally consist of twelve to twenty participants (Northcutt & McCoy, 2004, p. 87). Amongst other learning attributes, these participants should possess rich information regarding the objective of the study. The students should therefore shed light or different lights on the case study (Rule & John, 2011). This intended sampling choice made was that of purposive sampling. The research methodology, Interactive Qualitative Analysis (IQA), was guided by the purpose of a case study, to gain an understanding of the phenomenon

(Rule & John, 2011, p. 105), and it requires students to provide written feedback in order to deepen this understanding. The understanding that is generated by means of a case study was fitting for the interpretivist paradigm that this study lay in, as it provided an understanding of one specific real-life instance over a specific period of time in order to convey the reality of the phenomenon being investigated (Navarro Sada & Maldonado, 2007; Rule & John, 2011, p. 3).

When conducting qualitative research, interpretivist researchers used “trustworthiness”, which was further broken down into four concepts (Denzin & Lincoln, 2011; Rule & John, 2011, p. 106). Guba’s view regarding trustworthiness as the substitute to validity, reliability and rigour, used by positivist researchers, indicated that attention needed to be given to the transferability, credibility, dependability and confirmability of the study at hand. These are the naturalistic terms given to the four aspects of trustworthiness (Guba, 1981). Data was extracted from various sources, i.e. the focus group sessions, the tutorial attempts, semi-structured interviews and the reflective journals. This served as a form of triangulation in the case study research undertaken, as multiple viewpoints were explored (Baxter & Jack, 2008).

3. Interactive Qualitative Analysis (IQA): Phase One

3.1 Brainstorming the Rudiments of Meaning

The purpose of the brainstorming session as a focus group in the face-to-face environment was to generate the maximum number of individual ideas by writing down as many issue statements to the questions asked by the facilitator on the index cards provided for a period of approximately ten minutes. This process of privacy had its advantages and limitations (Northcutt & McCoy, 2004, p. 91). As the focus group was conducted during a pandemic, the conventional face-to-face protocol could not be adhered to. The use of online focus groups was elected in order to connect with the participants who were studying from their respective homes at scattered locations within the province. A synchronous online focus group, that is facilitated in real-time, was the approach adopted, as it closely resembled the conventional face-to-face approach (Stewart & Shamdasani, 2017). The online platform that the participants elected to utilise was that of an instant messaging platform (Stewart & Williams, 2005), WhatsApp Messenger, that was facilitated in real-time.

Instead of conducting this brainstorming session at the commencement of the focus group session, a document was sent via a WhatsApp Messenger group chat, to the participants a few days before, with questions regarding the participants’ learning journey. The participants were then requested to individually generate approximately twenty issue statements as responses to these questions and to then return these so that the responses of the group could be collated. This process was similar to the silent brainstorming session as it was conducted by the individual participant as it also had the advantage of reducing group pressure to respond like the other participants but allowed for the authenticity of the participant reflections. It also provided introverted participants with the full time to generate responses that they may have otherwise been afraid to vocalise (Northcutt & McCoy, 2004, p. 92). Participants had the opportunity to message the facilitator privately if they needed clarity regarding the questions sent. They also had the added advantage of having a few days to complete the issue statement generation and could therefore add more ideas, even if it was a day or so later. Some of the limitations of the silent brainstorming process were that some of the extroverted participants may have felt overwhelmed as they were better at articulating their thoughts out loud. Other participants may have felt helpless or alone when commencing with the brainstorming process as they may have required conversation prompts from other participants in order to assist them (Northcutt & McCoy, 2004, p. 92). However, this limitation was of no consequence as participants felt free to ask the facilitator questions via private messaging if they were unsure of anything. This process therefore eliminated the need for the index cards and pens used in the face-to-face environment.

3.2 Inductive Coding

The receipt of the participants’ issue statements via WhatsApp Messenger indicated the completion of the silent brainstorming process. Each participant had listed their issue statements with the corresponding questions sent. All the issue statements were then collated per question and the collated document was sent to the WhatsApp Messenger group chat in preparation for the group activities for the day. The focus group session started at 2pm on a Sunday, the agreed upon time and day of the participants. The participants indicated that Sunday, after Church and lunch, was an ideal time as they were available and rested and would be using their ample weekend cellular telephone data. Fourteen participants of the twenty attended. The outstanding six participants were privately messaged to remind them to attend the focus group session. After sending the collated document to the focus group, the focus group was sent the following instructions (see Table 1) for the day:

Table 1. Group Activity Instructions

GROUP ACTIVITY INSTRUCTIONS	
1.	Group the issue statements.
➤	You may group the issue statements into similar themes.
➤	You may use each question as a theme.
➤	You may subcategorise each theme into more than one theme.
2.	Name each theme.

The first group activity for the focus group participants to complete, was to review the collated issue statements document and to then group the issue statements into similar themes or affinities (Northcutt & McCoy, 2004, p. 98). As all the participants listed their issue statements per question, they were presented with two methods of grouping the issue statements before being asked if they identified any subcategories. The first method participants were presented with was the option to group the issue statements into similar themes. The second method participants were presented with was the option to use each question as a theme. In the face-to-face environment, the participants were asked to silently review the index cards that they taped onto the wall and to then group these index cards into similar themes. The participants elected to use the second method as each participant had already listed their issue statements per corresponding question asked. The focus group indicated that they did not identify any subcategories per theme. The word 'theme', and not 'affinity', was consistently used with the focus group as this was a familiar word to them all. For the purposes of this study, the word 'affinity' was used where relevant going forward. This first group activity eliminated the need for the index cards, sticky tape, wall space, tape recorder, tapes and batteries, used in the face-to-face environment as all activities were recorded on the WhatsApp Messenger group chat.

Thereafter, the focus group was directed to the second group activity for the day, that of naming each theme. The participants started by reading the first question and participants, at random, started to suggest possible names for each affinity. The facilitator, (lead author) assisted the focus group to name each affinity accordingly. The term used to describe this process of categorising the issue statements into different affinities, was that of 'inductive coding'.

3.3 Axial Coding

The next type of coding that occurred was that of axial coding. This type of coding oscillated from inductive coding to deductive coding as opposed to the exclusive nature of inductive coding. The axial coding process named and refined the affinities created (Northcutt & McCoy, 2004, p. 98). As the participants had different names for each affinity, the naming as well as the refining of the allocated name had to be facilitated especially when participants did not agree or needed more clarity.

3.4 Affinity Descriptions

Once the affinities had been named and all participants had reached consensus, a detailed explanation of each affinity was explained using the data collected (Northcutt & McCoy, 2004, p. 100).

3.5 Theoretical Coding

The objective of the IQA methodology is to create a picture, a Systems Influence Diagram (SID), representative of the mind map of the focus group participants with regard to the phenomenon outlined in the issue statements. The study elected to use the group reality and not the individual reality to create a mind map of the participants. A summary of theoretical codes used to capture the influences between affinities and an Inter Relationship Diagram (IRD), was used to draw the SID. The design of the IQA study involved accounting for three theoretical coding issues as follows: firstly, how much detail was required for each relationship; secondly, how the focus group was arranged for analysis of each relationship; and thirdly, how a group system was created (Northcutt & McCoy, 2004, p. 149).

4.5.1 Theoretical Coding Issue 1: Level of Detail

The participants were encouraged to provide examples from their experience for each affinity pair relationship that they identified. An Individual Detailed ART recorded each relationship pair direction with the required explanations (Northcutt & McCoy, 2004, p. 152).

The goodwill of the participants had to be appealed to in order to complete this lengthy document, as time was a limiting factor (Northcutt & McCoy, 2004, p. 152). Each participant was sent a document with the eight affinities identified, a set of examples describing what the forward arrow, backward arrow and dash meant in relation to the themes identified, eight tables and space for an explanation of the affinity pair relationship identified (see Table 2).

In a face-to-face environment participants would have been provided with pre-printed documents and tables at the focus group session (Northcutt & McCoy, 2004, p. 88) regardless of the type of ART elected for creating the group composite.

4.5.2 Theoretical Coding Issue 2: Organising the Focus Group

The second issue was how the focus group was to be arranged for the analysis of each relationship. If fifteen participants comprised the focus group, and each participant was requested to complete an ART this meant that there will be fifteen different sets of codes. If this fifteen-participant group was subdivided into five groups of three participants, then this meant that there will be five different set of codes (Northcutt & McCoy, 2004, p. 154). Individual Detailed ARTs are deemed to be effective because they are a continuation of the silent brainstorming process initially conducted.

The ARTs may be completed by each participant or the focus group may be organised into smaller groups, being dyads or triads, groups with two or three participants (Northcutt & McCoy, 2004, p. 156). As it would have been a challenge to administer each dyad or triad in an online platform, each participant was instead asked to complete an Individual Detailed ART in order to record the analysis of the affinity pair relationships as well as to provide an explanation per relationship either in natural language or an 'if, then' hypothesis statement. There were sixteen participants who completed the Individual Detailed ARTs, meaning that sixteen sets of codes from sixteen participants of twenty who had the available time to do so was obtained. The willingness of participants to complete additional unplanned activities in this newly-designed study that had to be conducted using online platforms in a limited time frame, was highly appreciated.

For the Individual Detailed ART, a composite document of eight tables was drawn up. Below is an example of the first (see Table 2) of the eight tables. This table was comprised of four columns. The first column listed only the first affinity, whilst the third column listed all the pairing options relevant to the remainder of the affinities identified. The second column was populated by the participants with either a forward arrow, backward arrow or a dash after they had analysed the relationship between each pair of affinities identified. The fourth column provided a space for an explanation of the affinity pair relationship identified.

Table 2. Individual Detailed ART Table 1

Relationship	Example of the relationship in natural language or 'if, then' statement
1	2
1	3
1	4
1	5
1	6
1	7
1	8

Individual Detailed ARTs are effective as they serve as a continuation of the silent brainstorming process initially conducted (Northcutt & McCoy, 2004, p. 156). The Individual Detailed ARTs allowed for the maximum collection of data and also provided for a wider variety of explanations. As such the Pareto Protocol was the appropriate method used to complement the detailed explanations provided (Northcutt & McCoy, 2004, p. 168).

4.5.3 Theoretical Coding Issue 3: Creating a Group Composite

This issue dealt with how a group system will be created. The Democratic Protocol or the Pareto Protocol were the available options and the time at the researcher's disposal dictated which protocol to use. The Democratic Protocol used the democratic majority vote and should be utilised if the dominant purpose is to generate an affinity list as opposed to conducting an in-depth analysis of the focus group (Northcutt & McCoy, 2004, p. 164). The Pareto Protocol is a powerful method used to chart the level of consensus within a focus group. This Protocol stated that the "minority of the relationships in any system will account for the majority of the variation within the system". The IQA methodology utilised the Pareto Protocol operationally to reach consensus and utilised this Protocol analytically in order to produce a statistical group synthesis (Northcutt & McCoy, 2004, p. 157).

Upon completion of the Individual Detailed ARTs, the Pareto Protocol was used in order to create the group composite and therefore the IRD. A Microsoft Excel spreadsheet was used to create a composite view of all sixteen participants'

Individual Detailed ARTs without the explanations in order to allow for the efficient tallying of each affinity pair relationship and to then record each frequency in affinity pair order (Northcutt & McCoy, 2004, p. 157). This process yielded 414 votes from the focus group participants as seen in Table 3 below.

Table 3. Frequency in Affinity Pair Order

Affinity Relationship	Pair	Frequency	Affinity Relationship	Pair	Frequency	Affinity Relationship	Pair	Frequency
1→2		2	2←5		5	4→6		9
1←2		14	2→6		9	4←6		5
1→3		10	2←6		4	4→7		10
1←3		5	2→7		10	4←7		4
1→4		3	2←7		5	4→8		10
1←4		13	2→8		10	4←8		4
1→5		2	2←8		4	5→6		13
1←5		14	3→4		2	5←6		3
1→6		8	3←4		12	5→7		12
1←6		7	3→5		0	5←7		3
1→7		12	3←5		14	5→8		12
1←7		3	3→6		10	5←8		3
1→8		9	3←6		4	6→7		8
1←8		7	3→7		7	6←7		7
2→3		16	3←7		9	6→8		4
2←3		0	3→8		10	6←8		9
2→4		12	3←8		5	7→8		6
2←4		3	4→5		8	7←8		8
2→5		9	4←5		7			
Total Frequency								414

These affinity pairs are then sorted in descending order of frequency (see Table 4). The next column is the *cumulative frequency*, which was calculated by adding the current frequency of votes for the affinity pair relationship to the total above. The *cumulative percent (relation)* was one of the two factors in the Power Index. It was based on the total number of possible affinity pair relationships, being 414 in this case. Each affinity pair relationship represented 1/414 which equates to 0,24% of the total. The *cumulative percent (frequency)* was based on the total number of possible affinity pair relationships. This was calculated by adding the current percentage of votes for the affinity pair relationship to the total above. *Power* is an index that was used to determine the degree of optimisation within the IQA system. This was calculated by subtracting the cumulative percent (relation) from the cumulative percent (frequency) (Northcutt & McCoy, 2004, p. 159).

Table 4. Affinities in Descending Order of Frequency with Pareto Power Analysis

No.	Affinity Pair Relationship	Frequency Sorted (Descending)	Cumulative Frequency	Cumulative Percent (Relation)	Cumulative Percent (Frequency)	Power
1	2→3	16	16	1,786	3,865	2,079
2	1←2	14	30	3,571	7,246	3,675
3	1←5	14	44	5,357	10,628	5,271
4	3←5	14	58	7,143	14,010	6,867
5	1←4	13	71	8,929	17,150	8,221
6	5→6	13	84	10,714	20,290	9,576
7	5→7	12	96	12,500	23,188	10,688
8	1→7	12	108	14,286	26,087	11,801
9	2→4	12	120	16,071	28,986	12,914
10	5→8	12	132	17,857	31,884	14,027
11	3←4	12	144	19,643	34,783	15,140
12	4→7	10	154	21,429	37,198	15,769
13	4→8	10	164	23,214	39,614	16,399
14	1→3	10	174	25,000	42,029	17,029
15	2→7	10	184	26,786	44,444	17,659
16	3→6	10	194	28,571	46,860	18,288
17	3→8	10	204	30,357	49,275	18,918
18	2→8	10	214	32,143	51,691	19,548
19	1→8	9	223	33,929	53,865	19,936
20	2→5	9	232	35,714	56,039	20,324
21	2→6	9	241	37,500	58,213	20,713
22	3←7	9	250	39,286	60,386	21,101
23	4→6	9	259	41,071	62,560	21,489
24	6←8	9	268	42,857	64,734	21,877
25	1→6	8	276	44,643	66,667	22,024
26	4→5	8	284	46,429	68,599	22,170
27	6→7	8	292	48,214	70,531	22,317
28	7←8	8	300	50,000	72,464	22,464
29	1←6	7	307	51,786	74,155	22,369
30	1←8	7	314	53,571	75,845	22,274
31	3→7	7	321	55,357	77,536	22,179
32	4←5	7	328	57,143	79,227	22,084
33	6←7	7	335	58,929	80,918	21,989
34	7→8	6	341	60,714	82,367	21,653
35	1←3	5	346	62,500	83,575	21,075
36	2←5	5	351	64,286	84,783	20,497
37	2←7	5	356	66,071	85,990	19,919

38	3←8	5	361	67,857	87,198	19,341
39	4←6	5	366	69,643	88,406	18,763
40	2←6	4	370	71,429	89,372	17,943
41	2←8	4	374	73,214	90,338	17,124
42	3←6	4	378	75,000	91,304	16,304
43	4←7	4	382	76,786	92,271	15,485
44	4←8	4	386	78,571	93,237	14,665
45	6→8	4	390	80,357	94,203	13,846
46	1→4	3	393	82,143	94,928	12,785
47	1←7	3	396	83,929	95,652	11,724
48	2←4	3	399	85,714	96,377	10,663
49	5←7	3	402	87,500	97,101	9,601
50	5←8	3	405	89,286	97,826	8,540
51	1→2	2	407	91,071	98,309	7,238
52	1→5	2	409	92,857	98,792	5,935
53	3→4	2	411	94,643	99,275	4,633
54	5←8	3	414	96,429	100,000	3,571
55	3→5	0	414	98,214	100,000	1,786
56	2←3	0	414	100,000	100,000	0,000

The MinMax Criterion

The affinity pair relationships that will be included in the group composite IRD are determined by analysing the Cumulative Percent (Frequency) column and the Power column of the table with the affinities in descending order of frequency with Pareto Power analysis. This meant that the cutoff point needed to be determined in order to decide which affinity pair relationships will be included and therefore also excluded. This decision required the optimisation of a trade-off between the maximum variation in the IQA system whilst also minimising the affinity pair relationships for the sake of parsimony (Northcutt & McCoy, 2004, p. 160).

Accounting for Maximum Variance

The Pareto Principle indicated that of the possible 56 affinity pair relationships, a minimal number of relationships accounted for the majority of the variance. Therefore, the first 12 affinity pair relationships (21,429% of the total) accounted for 37,198% of the total variation in the IQA system and the first 28 affinity pair relationships (50,000% of the total) accounted for 72,464% of the total variation in the IQA system.

Maximum Variance: Frequency

Figure 1 accounted for the variance for each succeeding relationship.

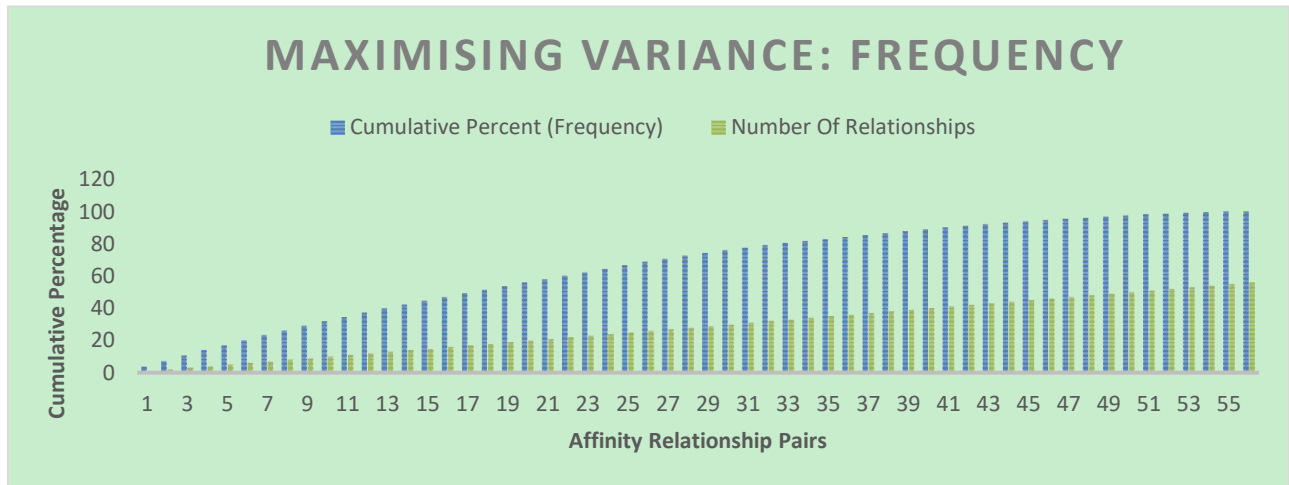


Figure 1. Maximising Variance - Frequency

Minimising the Number of Affinities: Power

Figure 2 illustrated the power analysis for the IQA system. Power was at the maximum at 28 affinity pair relationships, which accounted for 72,464% of the total variation in the IQA system. Therefore, these 28 affinity pair relationships represented an optimal number of affinity pair relationships for inclusion in the group composite IRD as it was in accordance with the MinMax criterion.

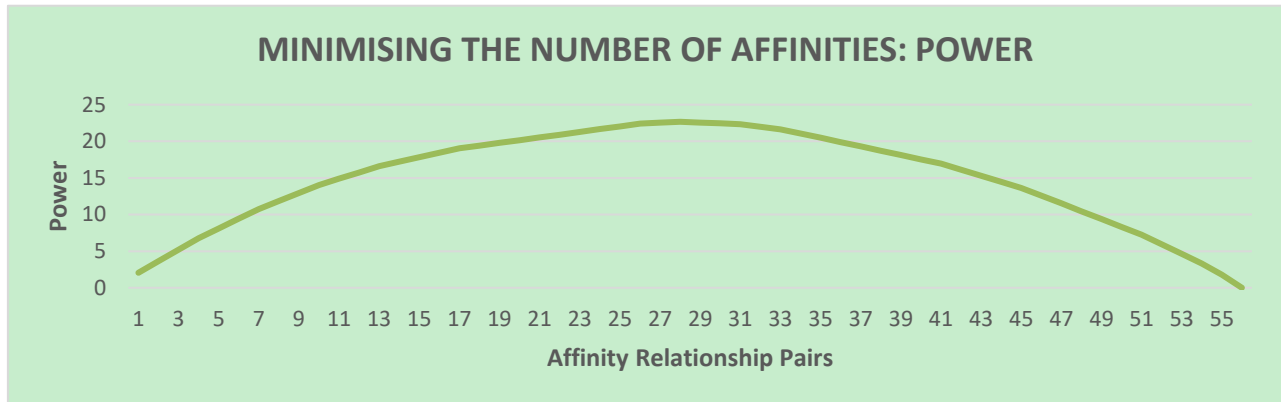


Figure 2. Minimising the Number of Affinities - Power

Creating A Group Composite: The IRD

The data generated from the focus group session was populated in a table consisting of all the affinity pair relationships identified by the group called an Inter Relationship Diagram (IRD) (see Table 5). The researcher used arrows to indicate whether each affinity in the pair is viewed as the driver or outcome or if no relationship existed between the affinity pair (Northcutt & McCoy, 2004, p. 170). For example, the affinity pair relationship A→B denoted that affinity A influences or drives affinity B, being the influenced or outcome. The IRD utilised arrows that point upwards and point to the left. The pink blocks in the IRD that are blank, indicated that an affinity cannot influence itself. Each affinity pair relationship was treated like a double-entry bookkeeping system as they are recorded twice in the IRD. Therefore, an upwards pointing arrow indicated that row A is influencing or driving column B, using the example with affinity pair relationship A→B, and a left pointing arrow indicated that a column is influencing or driving a row. Each row was then analysed in order to determine the delta (Δ), which was calculated by subtracting the number of left arrows from the number of up arrows. After each row was analysed, the IRD was then arranged in descending order of delta determined (see Table 6) (Northcutt & McCoy, 2004, p. 172).

Table 5. Tabular IRD

	1	2	3	4	5	6	7	8	Out ↑	In ←	Δ
1	█	←	↑	←	←	↑	↑	↑	4	3	1
2	↑	█	↑	↑	↑	↑	↑	↑	7	0	7
3	←	←	█	←	←	↑	←	↑	2	5	-3
4	↑	←	↑	█	↑	↑	↑	↑	6	1	5
5	↑	←	↑	←	█	↑	↑	↑	5	2	3
6	←	←	←	←	←	█	↑	←	1	6	-5
7	←	←	↑	←	←	←	█	←	1	6	-5
8	←	←	←	←	←	↑	↑	█	2	5	-3

Table 6. Tabular IRD - Sorted in Descending Order of Δ

	1	2	3	4	5	6	7	8	Out ↑	In ←	Δ
2	↑	█	↑	↑	↑	↑	↑	↑	7	0	7
4	↑	←	↑	█	↑	↑	↑	↑	6	1	5
5	↑	←	↑	←	█	↑	↑	↑	5	2	3
1	█	←	↑	←	←	↑	↑	↑	4	3	1
3	←	←	█	←	←	↑	←	↑	2	5	-3
8	←	←	←	←	←	↑	↑	█	2	5	-3
6	←	←	←	←	←	█	↑	←	1	6	-5
7	←	←	↑	←	←	←	█	←	1	6	-5

The purpose of the IRD was to determine which affinities were drivers and which affinities were outcomes by using the delta values (see Table 7). Affinities with positive deltas are called relative drivers, whilst affinities with negative deltas are called relative outcomes. A means of understanding elements and the relationships between these elements was by describing elements as drivers and outcomes. A driver is a cause or an influencer with more arrows going “out” rather than “in”, with the opposite being true for an outcome. Drivers and outcomes can further be classified as primary and secondary, with primary drivers having all arrows going “out” and none going “in” with the opposite being true for a primary outcome. Secondary drivers have more arrows going “out” rather than “in”, with the opposite being true for secondary outcomes (Northcutt & McCoy, 2004, p. 32).

Table 7. Tentative SID Assignments

Tentative SID Assignments		
2	Adopting a Holistic Approach to Learning	Primary Driver
4	Demystified Threshold Concepts Infused Materials	Secondary Driver
5	Learning Challenges	Secondary Driver
1	Learning Experiences	Secondary Driver
3	Various Learning Outcomes	Secondary Outcome
8	Learning Attributes	Secondary Outcome
6	Emotional Responses	Primary Outcome
7	Perceptions	Primary Outcome

Focus Group Systems Influence Diagram

The affinity pair relationships populated in the IRD were then used to create a visual representation of a system of drivers and outcomes called a SID. The system’s affinities were presented from left to right commencing with drivers and concluding with outcomes. The primary drivers were presented on the extreme left with the primary outcomes being presented on the extreme right. Secondary drivers and secondary outcomes were placed in between the primary drivers and outcomes, with the secondary drivers being on the left and the secondary drivers being on the right (Northcutt & McCoy, 2004, p. 175). The Cluttered SID (see Figure 3) consisted of all relationships within the IRD, making this diagram a very comprehensive one, with limited explanatory value.

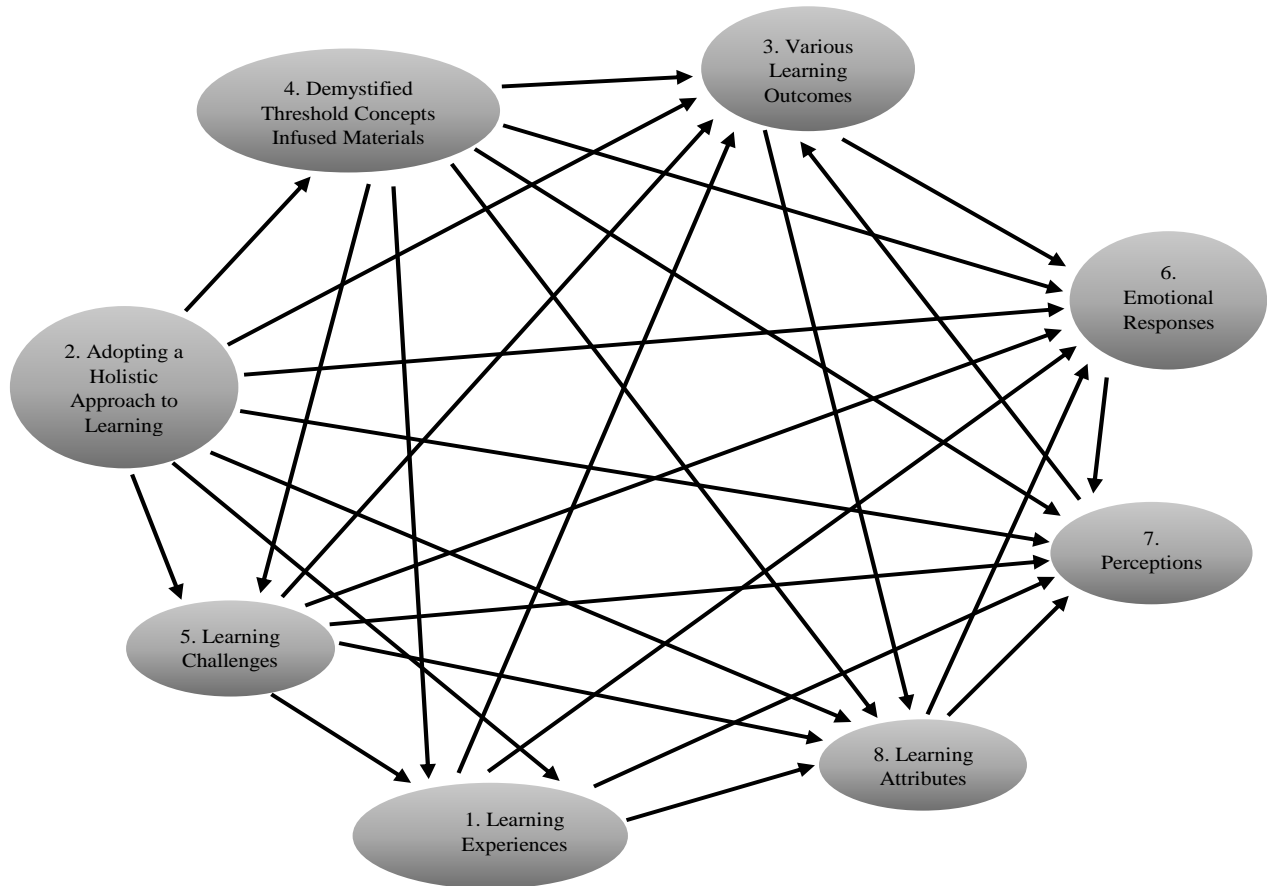


Figure 3. Cluttered SID

The Uncluttered SID (see Figure 4) had all redundant relationships removed, allowing for easier interpretation (Northcutt & McCoy, 2004, p. 176). An analysis from highest positive delta to highest negative delta was conducted. If there was a path between these two deltas, then the direct link may be removed. This process continued until all redundant links were removed, allowing the researcher to draw a Clean SID or Telephoto View SID.

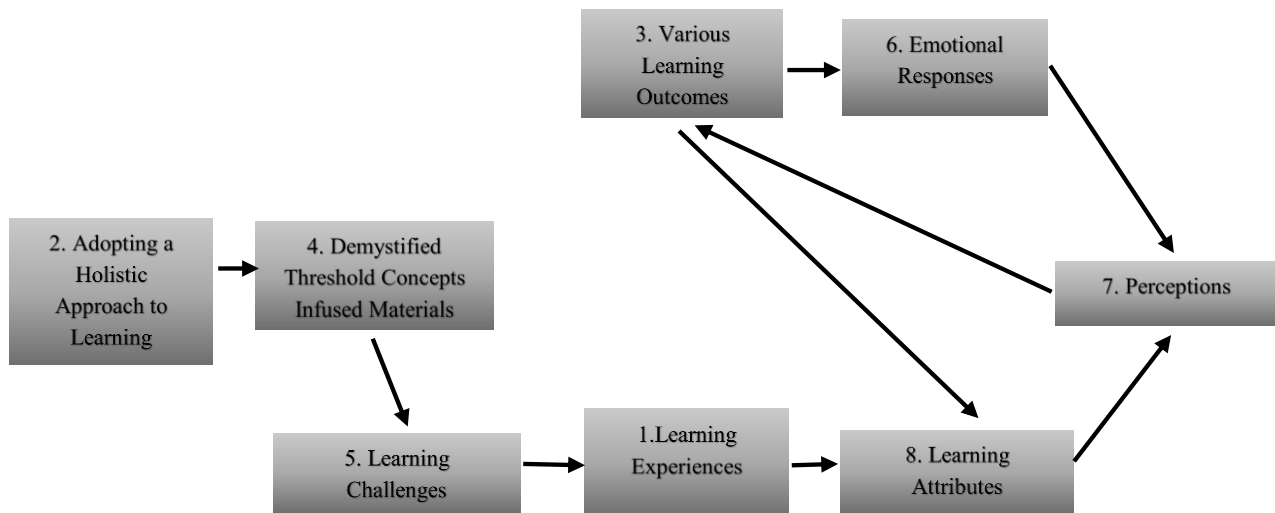


Figure 4. Uncluttered SID

A Tour Through the System

The Uncluttered SID in Figure 4 provided the following interpretation of the study with the participants: The holistic approach to learning adopted by the participants influenced how effectively they interacted with the Accounting 101 threshold concepts tutorial questions. The design of these demystified threshold concepts infused materials, the tutorial questions, also influenced the challenging dynamics of the discipline content. The learning challenges found within the discipline content influenced the learning experiences of the participants and in turn also influenced the learning attributes the participants discovered about themselves from this process. The learning attributes possessed also influenced the way in which the participants perceived themselves and the discipline, which in turn influenced them to acquire the various learning outcomes with more confidence. The acquisition of these various learning outcomes resulted in further learning attributes being acquired. This three-affinity micro system was representative of a feedback loop within the entire macro system. The perception participants possessed of themselves and the discipline, after acquiring further learning attributes, had the effect of influencing the various learning outcomes that they acquired. These various learning outcomes also had the effect of influencing the way the participants responded emotionally towards the discipline as well as the way they perceived themselves and the discipline throughout the study. This three-affinity micro system was representative of another feedback loop within the entire macro system.

Epistemological Acrobatics: Zooming In, Zooming Out, and Looping

‘Zooming in’ involved the researcher focusing on one of the elements in the system and recognising a micro system within that particular element. ‘Zooming out’, however involved the researcher recognising that this micro system was one of the elements within a larger macro system (Northcutt & McCoy, 2004, p. 35). ‘Looping’ are the recursions that provided the researcher with the means to understand the complicated dynamics within the system, made up of at least three affinities, that were representative of conventional social systems (Northcutt & McCoy, 2004, p. 36). The two sets of micro systems or feedback loops identified for this study were as follows:

- Learning Attributes, Perceptions, Various Learning Outcomes, and
- Perceptions, Various Learning Outcomes, Emotional Responses

The name assigned to these micro systems was determined by analysing the axial coding session and affinity descriptions provided. The affinities of the first micro system suggested the name ‘talented’, which referred to the conceptual troublesomeness. The affinities of the second micro system suggested the name ‘enjoyment’, which referred to the emotional troublesomeness. These ‘superaffinities’ will substitute the feedback loops as one of the elements within the larger macro system.

$$2 - 4 - 5 - 1 - (8 - 7 - 3 - 8) - (7 - 3 - 6 - 7)$$

Figure 5. Telephoto View SID

The Clean SID or the Telephoto View SID (see Figure 5), was the Uncluttered SID version showing the redundant relationships in a devalued colour (Northcutt & McCoy, 2004, p. 180). This Telephoto View SID (Northcutt & McCoy, 2004, p. 333) was the same as the Uncluttered SID except that it incorporated the feedback loops identified and cannot be zoomed out further and therefore resulted in an overall linear view.

4. Interactive Qualitative Analysis (IQA): Phase Two

4.1 Individual Reality: IQA Interview

IQA is a very rigid methodology that adhered to the rules of systematisation in a qualitative research environment. The meaning of the phenomenon was represented in terms of affinities and the relationships between these affinities. The interview is therefore directed by the affinities identified in the focus group session as a second set of data collection. The first phase of the interview is called the axial interview and this involved the researcher asking the individual participants what each affinity meant to them as well as to provide their experiences with each affinity (Northcutt & McCoy, 2004, p. 197). The second phase of the interview is called the theoretical interview and this involved the researcher asking the individual participants to provide an analysis of the relationships that they perceived to be between the affinities (Northcutt & McCoy, 2004, p. 199). This phase of the IQA process will be fully discussed a subsequent paper.

5. Conclusion

Even though IQA is a predominantly qualitative method, it has the effect of also allowing researchers in the fields of commerce to incorporate quantitative data with qualitative data systematically (Bargate, 2015) as each step of the process is listed. A focus group was used to drive this methodology by identifying affinities regarding the phenomenon of the study. The participants then analysed the relationships amongst the affinities, using an Affinity Relationship Table (ART), that was then mapped to produce an Inter Relationship Diagram (IRD). The final product was a visual representation of each affinity pair relationship that had emerged, a Systems Influence Diagram (SID). Thereafter semi-structured interviews were conducted in order to validate the Systems Influence Diagram and to provide a deeper meaning of the affinities created.

The written reflections of the participants as a result of implementing the chosen methodology, Interactive Qualitative Analysis (IQA): the affinity descriptions, the affinity pair relationships identified, the semi-structured interviews conducted, and the reflective learning journals, provided a detailed description of the experiences of the non-major accounting students' learning of Accounting 101 in a threshold concepts tutorial programme. These descriptions yielded a holistic view of the conceptually and emotionally troublesome experiences of the participants, much like Shakespeare's Macbeth, who also encountered two types of troublesomeness or turmoil en route to becoming king (Gupta, 2021).

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