QUANTIFYING QUALITATIVE NUMERACY INTERVIEW DATA

Debbie Stott and Mellony Graven

South African Numeracy Chair Project, Rhodes University

In this paper we explore the usefulness of generating quantifiable data from orally administered numeracy assessment interviews. The data primarily derived from these interviews allows powerful profiling of an individual learner's mathematical proficiency across a range of the key aspects using the Learning Framework in Number (LFIN) developed by Wright, Martland, Stafford, and Stanger (2006). We use the LFIN as intended to profile our individual club learners but we have found that by using the LFIN as the construct around which to generate quantifiable data we are able to gain a broader picture of our club's progress and the learners within them. We hope that by presenting these insights that we can add to the body of work that uses the LFIN and provide exemplification for how it may be used in a South African maths club context.

INTRODUCTION: CONTEXTUAL BACKGROUND

The aims of the South African Numeracy Chair (SANC) project focuses on a dialectical relationship between development and research. Our research community consists of full time and part time doctoral and masters students researching in the field of numeracy education under the supervision of the Chair. The first author is a full time doctoral fellow and intern in the SANC project researching the nature of student learning within Grade 3 after-school maths clubs. The first author is also responsible for the design and setting up of the clubs. In terms of development, our teacher development programme, the Numeracy Inquiry Community of Leader Educators (NICLE) runs alongside other learner focused activities which foreground the importance of numeracy as well as creating a 'maths is fun' ethos in schools. One initiative we piloted in 2011 and began in 2012 was the introduction of after school maths clubs. These have become a key aspect of our work. The conceptualisation and design of these clubs has been elaborated in previous work (Graven & Stott 2012a; Stott & Graven 2013).

After School Maths Clubs

Graven (2011) has previously argued that after school mathematics clubs hold the potential for increasing student opportunity to learn and enrich their mathematical experiences in ways that are free from curriculum and assessment driven teaching practices.

Within the SANC project we run 9 clubs. The clubs run for about an hour every week after school during term time. These informal learning spaces allow the learners opportunities to actively engage with mathematics and sense making as well as for mathematical confidence building. The clubs have been conceptualised in such a way

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that both the needs of the whole group and that of the individual learners in the club drive the club 'curriculum'. In other words, we work from where the learners are and attempt to develop each learner's learning trajectory (Simon 1995) from that point. Our data is therefore instrumental in developing the way forward for each club. It is for these reasons that we have chosen to work with small groups of learners in the clubs (normally between 10 and 12). In this way we can review and analyse the data collected and constantly view the club as a whole and as a collection of individuals. This enables us to be able to zoom out to see a broader picture of the whole clubs' learning trajectory and then to zoom in on specific learner trajectories and the needs of the individual learners. The on-going dialectical movement between these drives the need to have data to support the different levels of examination.

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

The SANC project as a whole works towards improving numeracy proficiency among learners and bases its notion of mathematical (or numeracy) proficiency on Kilpatrick, Swafford & Findell's (2001) definition of *mathematical proficiency*. This definition comprises five intertwined and interrelated strands of *conceptual understanding, procedural fluency, strategic competence, adaptive reasoning* and *productive disposition*.

Since the aim is for learners in our clubs to develop mathematical proficiency in each of these five strands, we need a way of tracking and seeing how learners actually develop towards this fully elaborated notion of mathematical proficiency (Graven & Stott 2012b). The *Learning Framework in Number* (LFIN) developed by Wright and his colleagues (Wright, Martland, Stafford, & Stanger 2006) provides us with a valuable way of doing this. This framework has been used to research and document progress in number learning of five to eight year old students in the first three years of schooling. As an intervention programme it involves intensive one-to-one teaching of low-attaining students (Wright et al. 1996) but has also been used with students of all levels of attainment. The intervention programme known as 'Mathematics Recovery' (Wright 2003) has been used extensively by school systems in several countries including Australia, Canada, the United States, the UK and Ireland (Wright, Martland & Stafford 2006).

Whilst Mathematics Recovery has been used and tested in these other countries, it has not yet been implemented in a South African context. However, research in South Africa on the programme is beginning to grow, particularly by scholars working in the SA Numeracy Chairs. See for example Weitz (2012). Due to the nature of our South African classrooms, it is not always possible to use such frameworks in a one-to-one scenario and the power of the framework is never realised in our local context. Several research projects within our team are working with the LFIN and aim to illuminate how the framework could work in South Africa and at the same time contribute to the body of Mathematics Recovery literature with a South African perspective.

The authors work with a version of the LFIN that combines elements from Wright and colleagues 2006 and 2012 works. The key aspects of the LFIN are:

A. Number words and numerals (including forward and backward sequences)
B. Structuring numbers 1 to 20
C. Conceptual place value knowledge (ability to reason in terms of tens and ones)
D. Addition and subtraction 1 to 100 (strategies for counting and solving simple addition and subtraction tasks)
E. Early multiplication and division (Wright, Ellemor-Collins & Tabor, 2012; Wright, Martland & Stafford 2006)

Each of the key aspects of the LFIN can be elaborated into a progression of up to six levels or stages. Each aspect has a model describing the characteristics of the levels or stages (Wright, Martland, Stafford et al. 2006).

The LFIN framework is a powerful tool for profiling an individual club learner's mathematical proficiency across the range of the key aspects. Profiling of learners' mathematical proficiency in this way forms a basis for planning our club activities and mediatory interventions that are tailored to each learner's current levels of proficiency and strategies (Wright 2003). It also gives us a way of seeing if there is progression from one level (stage) to another, over time for the individual learner.

Additionally, the LFIN and the principles of Mathematics Recovery have provided the basis for our orally administered numeracy instrument (see section below) as well as a way of structuring and reporting on data from these instruments as we do in this paper.

GATHERING DATA ON LEARNER MATHEMATICAL PROFICIENCY

In early 2012 we introduced a one-to-one, individual oral interview instrument into the clubs. For this instrument we drew on the work of Askew and his team in the *Effective Teachers Of Numeracy* study conducted in England in the nineties (Askew, Brown, Rhodes, Johnson & William 1997). They gave us their permission to use the instrument and provided us with a copy. From this we were able to select and adapt various items they used in assessing learners' numeracy proficiency. However the work of Wright et al. (2006) on Mathematics Recovery also provides excellent opportunities and examples of assessment items that enable one to gauge learner progress through various stages of numeracy development. This framework (LFIN) has been briefly explained above. The assembled instrument (of 24 tasks in total) combines tasks (sometimes adapted) from both these key works. Individual tasks are grouped together to constitute a full picture for a particular LFIN aspect. The instrument is translated into Afrikaans and isiXhosa as these languages are widely spoken in the area. Learners are interviewed in their language of learning and teaching with translation into their home language where necessary.

In this paper we report on data derived from interviews with seven learners in one club. This club is one of two case study clubs of the first author's doctoral research. These learners were drawn from two grade three classes at one school and were selected to participate in the club by their teachers. The language of learning and teaching of the school and the club is English. The club initially had 12 learners but for various logistical reasons such as transport arrangements, five learners dropped out.

The instrument was administered individually to each club learner in April 2012 and again in November 2012. Individual interviews lasted between 45 to 60 minutes each.

DATA DERIVED FROM THE INSTRUMENT

Data collected on the two case study clubs for the first author's doctoral study is by and large qualitative. Preliminary findings indicate that this one-to-one oral instrument yields rich qualitative data mostly in the form of a profile of the leaner against the LFIN framework, the methods used to answer the questions and the time it took for them to do so. The instruments primary strength lies in the fact that it enables us to tell detailed stories about learners in the clubs. Analysis of the methods the learners used to answer the questions posed in the interview enables us to profile where the learner is in terms of the aspects and stages of the LFIN and allows us to see a clear picture of how the learner is progressing over time. This primary level of data using the LFIN as intended forms our first and second level of data for each individual learner in the clubs (see Table 2).

Table 2: Summary of the types of data derived from the interview instrument.

	Level of data	Data type	
Full club learner profile in Early Number	1	INDIVIDUAL Learner LFIN Profile in terms of levels/stages**	
	2	INDIVIDUAL Learner methods of answering questions **	
	3	INDIVIDUAL learner MP Interview % scores§	INDIVIDUAL Learner Aspect MP Interview scores§
Club data	4	CLUB MP Interview % scores§	CLUB Aspect MP Interview scores§

Key: § yields broad quantifiable, aggregated data
** yields individual qualitative/profiling data

Bobis, Mulligan & Lowrie (2009) add that a learner's location in a framework can be utilised as a guide in determining the types of learning experiences that will be most useful in meeting the learner's individual needs at that particular stage in their

learning. This notion is critical to how we plan activities and mediatory interventions subsequent to the first interview.

Having said that, in line with our need to see both the broad and detailed picture, we have found that the instrument can also yield quantifiable data to supplement the highly individualised qualitative data that the framework is so useful for. We call this quantifiable data the 'Mathematical Proficiency (MP) Interview Scores' and we generate and work with three types of scores: first an overall score (or mark) for each individual interview expressed as a percentage. Secondly, we generate a percentage score for each aspect of the LFIN. Finally, we can use these generated scores to aggregate across the club as a whole and across more than one club by working out averages, frequencies, counts and so on. These scores provide us with our third and final level of data for the clubs. It must be stressed that we use these third and fourth level scores to supplement the level one and two data which is the primary purpose of the LFIN.

These different types of data give a rich picture of where a club learner is in their Early Number learning. Table 2 gives a summary of the different levels of data that we can gain from the interview instrument data as we have discussed above.

GENERATING QUANTIFIABLE DATA

Generating this quantifiable data is relatively straightforward and is achieved by entering a '1' for an accurate answer and a '0' for an inaccurate one into a standard spreadsheet and then collating the questions under different LFIN aspects. Table 3 shows which tasks fall under each LFIN aspect and how many individual questions make up the score for each aspect.

Table 3: Number of questions underlying each LFIN aspect.

Aspect	A: Number words & numerals	B: Structuring numbers 1 to 20	C: Conceptual place value	D: Addition & subtraction 1 to 100	E: Early multiplication & division	
Interview task numbers	1 to 7	8 and 16	9, 10, 11	12 to 15	17 to 24	24 tasks in total
Number of questions in those tasks[14]	32	8	13	14	20	87 questions in total

To clarify let's look at some examples. From Table 3 we see that interview tasks 12, 13, 14 and 15 make up the '*Addition and subtraction 1 to 100'* aspect. If we look at

[14] One mark per question

Task 12 (shown below) we see it has four questions, whilst Task 15 (also shown below) has six questions. Tasks 13 and 14 have another four questions, making a total 14 questions. If each correct answer is allocated a '1', then the highest possible score for this aspect is 14.

Task 12: Horizontal sentences – Early Arithmetic Strategies **W**

[Use blue sentence cards] *Tell me how you would work out the answer to:*

	Note Given Responses & How Answered	Correct
• *16 + 10 = ☐* • *So what is 16 + 9?*		
• *42 + 23 = ☐* *If correct ask, Do you have another way to work it out or check it?*		
• *43 – 15 = ☐* *Repeat the question above*		

Task 15: Non-count-by-ones – Early Arithmetic Strategies **W**

[Use the orange calculation cards. Note how learner arrives at answers]

	Note Given Answers & How Answered	Correct?
• *What is 9 + 3*		
• *Can you use that to help you work out 9 + 4*		
• *and 9 + 5*		
• *What is 7 – 5*		
• *Can you use that to help you work out 27 – 5*		
• *and 47 – 5*		

Figure 2: Tasks 12 and 15 from the interview instrument.

Interview tasks one to seven make up the *Number Words and Numerals* aspect. If we look at task one (shown below) we see that the question has ten questions. Tasks two to seven have another 22 questions, making a total 32 questions. If each correct answer is allocated a '1', then the highest possible score for this aspect is 32.

Task 1: Numeral Identification **W**

[Use number cards to show each number to learner. Tick if correctly identified]

Tell me the name of these numbers

6 11 20 99 101 208 300 1025 ½ ¼

Figure 3: Task one from the interview instrument.

In order to arrive at a percentage score for the entire interview and for each aspect, we add up the question scores for each aspect and divide by the total possible score for that aspect. Using task one again as an example (Figure 4), Kayla got each question in task 1 correct, thereby scoring 100%. Azi got one wrong, thereby scoring 90%.

We acknowledge that the relatively small number of items in some of the aspects (namely B, C and D) is a limitation of this approach. A correct or incorrect answer to one question can translate into a large percentage change. In the example above, Azi incorrectly named 1025 as "one hundred and twenty five". If she then named this correctly in a later interview, her score would jump from 9 out of 10 (90%) to 10 out of 10 (100%) showing a difference of 10%. We argue that due to the meticulous structuring of the underlying interview items, these changes are indeed significant and reflect mathematical progress.

Child Name	Task 1 %	Task 1 Score	1a. (6)	1b. (11)	1c. (20)	1d. (99)	1e. (101)	1f. (208)	1g. (300)	1h. (1025)	1i. (1/2)	1j. (1/4)
TOTAL POSSIBLE		10										
Kayla	100%	10	1	1	1	1	1	1	1	1	1	1
Azi	90%	9	1	1	1	1	1	1	1	0	1	1

Figure 4: Example scoring for Task One from the interview instrument for two learners.

For example, looking at Task 1, the numbers in the task are structured in such a way that they show progression from naming single digit to four digit numbers and simple fractions. Our results from the interviews across clubs show that Grade 3 club learners often struggle with saying the correct number names for 208, 1025, ½ and ¼. Being able to correctly say these at a later stage, shows progress.

Bob Wright (2003: 8) specifically stated that Mathematics Recovery "assessment does not result in a score. This was re-affirmed during an informal conversation with him during one of his workshops at the Early Childhood Research and Development Week held in Grahamstown in September 2012. Wright confirmed that he has not subsequently used scoring as a summary tool with the Mathematics Recovery interview data. For him, the interview data is always used to profile the individual child's stage of early number learning in the LFIN using stages and levels.

Whilst it seems contradictory to take this position, we argue that such scoring can be useful in relation to the broader study that seeks to examine how learners' mathematical proficiency levels evolve (if at all) over the period of participation in the maths clubs. We have highlighted that in the clubs we try to balance the needs of the whole group with those of the individual learners. It is this quantifiable data that helps us to zoom out of individual detail and see the broad picture for the club as a whole and where overall areas of strengths and weakness lie and where our contribution from this paper lies. During the same workshop conversation with Bob Wright mentioned above, he too thought that it might be useful to explore this notion further. After conducting the first series of interviews and entering the scores we are able to see where the club learners had achieved high scores and low scores. Even at this broad level we are able to use this information to plan activities for the whole club that addressed areas of weakness. This is discussed in more detail in the sections below.

In addition the simple percentage score can show how accurate the learner is in getting the question correct and possibly gives a simple indicator of the extent of their Early Number knowledge.

Working as we do in many clubs, it is extremely useful to be able to compare different clubs to each other. By working with percentages, we are then able to usefully aggregate these in order to make comparisons across more than one club. By generating visual summaries in the forms of tables, matrices and graphs of the club results as a whole (rather than on an individual basis) we can make these types of comparisons between clubs rather than only between learners.

These types of comparisons across the whole club or sets of clubs cannot be generated by simply using the aspect stages or levels detailed within the LFIN itself, as each set of stages or levels is profoundly different and one would not be comparing like with like. An example may help to illustrate. The '*Addition and subtraction 1 to 100'* aspect has 6 stages numbered from 0 to 5 with a particular set of descriptive characteristics whilst the '*Conceptual place value'* aspect has 3 levels numbered from 1 to 3 with a completely different set of descriptive characteristics (see Table 4). Therefore it is not possible to aggregate using the stage or level numbers.

Table 4: Stages for two LFIN aspects (Wright et al. 2006; Wright, et al. 2012).

Aspect D: Addition and subtraction 1 to 100 (Stages)	Aspect C: Conceptual Place Value (Levels)
0 Emergent counting	1 Initial concept of 10
1 Perceptual counting	2 Intermediate concept of 10
2 Figurative counting	3 Facile concept of 10
3 Initial number sequence	
4 Intermediate number sequence	
5 Facile number sequence	

What the percentage scores and aggregations do not show of course is the more in-depth story of how learners arrived at their answer, or how efficient or sophisticated their chosen method of working it out was. This is where the power of the LFIN comes in for us in the clubs. We can profile the learner against the LFIN aspects and stages and see where individual areas of strength and weakness are. This gives us the opportunity to zoom back into the detail for a particular learner and to plan how best to pull that particular learner forward in the context of the broader club environment.

The section that follows illustrates how the percentage scores and aggregations (i.e. quantifiable data generated from the interviews) are used in our clubs. It is important to note that whilst this paper focuses purely on the third and fourth levels of data (shown in Table 2), in our research and club work, we use the *full* range of data that the instrument provides.

PRESENTATION OF DATA FOR ONE CLUB CASE STUDY

Overall Club MP Interview Scores

Table 5 gives a summary of the results for
the seven learners in the two assessments
and shows the percentage change from the March to November 2012 assessment in one club.

Table 5: Overall interview % scores for all learners in Club A.

Learner	March	November	% change
Azi	88.6%	98.9%	10.2%
Lulu	92.0%	95.5%	3.4%
Kayla	96.6%	100.0%	3.4%
Nate	87.5%	94.3%	6.8%
Zac	92.0%	97.7%	5.7%
Thembisa	80.7%	98.9%	18.2%
Zando	88.6%	95.5%	6.8%
Average	89.4%	97.2%	7.8%

We can see that there was an overall improvement ranging between 3.4% and 18.2% across all learners (an average of 7.8%). In November, we can see that every learner achieved a score of 94% or more in the interview. Kayla achieved 100% in November and shows a small improvement but her March scores were already high. Thembisa has made the biggest overall improvement with 18.2% whilst Lulu has the smallest improvement of 3.4%. The scores reflect that even though these seven learners scored well in the March assessment, they still progressed pleasingly during their participation in the club.

Along with these increases in scores, it was noted by interviewers that all the learners completed the November interview in 10 to 15 minutes less than in March. There could be many explanations for this including that perhaps the learners used quicker or more efficient methods to answer the questions or that they simply 'knew' more. Examining the March and November interview scripts in detail to ascertain the methods they used could confirm these observations.

MP Interview Scores by Aspect

We now illustrate how we use the LFIN aspect scores and aggregations in the form of averages to gain access to where the learners need development and intervention and how we can focus on this in our club activities.

These are the aspects of the LFIN that we work with: A – Number Words and Numerals; B – Structuring Numbers 1 to 20; C – Conceptual Place Value; D –

Addition and Subtraction 1 to 100 and E – Early Multiplication and Division. For simplicity in writing and presenting tables and graphs, we will refer to the aspect by its letter. Table 6 shows the percentage change that each learner achieved between the March and November assessments for each LFIN aspect.

Table 6: Learner % change March to November in Club A.

Learner	A	B	C	D	E
Azi	9%	0%	23%	7%	10%
Lulu	6%	0%	15%	-14%	5%
Kayla	0%	0%	8%	0%	10%
Nate	6%	-13%	15%	-7%	20%
Zac	3%	0%	8%	14%	5%
Thembisa	19%	0%	23%	21%	15%
Zando	-3%	0%	31%	14%	10%
Average	6%	-2%	18%	5%	11%

Of particular note are: Thembisa achieved the highest change (19%) for Aspect A, Zando the highest for Aspect C (31%), Thembisa for Aspect D (21%) and Nate for Aspect E (20%). Aspect B, where the learners were already strong (See Table 6 and Table 6 for detail) shows a disappointing negative growth for Nate of -13%. In fact, looking at his script he made one simple error on a question in Task 16, which has affected his score. From a table such as this, we can see at a glance that Kayla, who was strong in March has maintained that level, with two areas of pleasing progress and that Thembisa has progressed exceptionally well in all aspects. Nate and Lulu both show negative progress. Possible reasons for these overall changes are discussed in more detail below.

March

Results for the March assessment (shown in Table 7) indicate the scores each club learner achieved for each LFIN aspect. Aspect B seems to be an area of strength for all learners, with a majority of learners gaining over 81% in Aspect A. Even though the scores for the other aspects are not low (69% is the lowest), there is more of a spread across the percentage ranges from the 69% to 100%.

Following this first assessment and based on these scores, we made the decision to focus on activities that developed aspects C and D in the first two terms. Using observations from the early club session for Aspect C (Conceptual Place Value), we saw that the club learners were relatively strong in their understanding of place value with respect to units, tens and hundreds. As a result we decided to work on strengthening their conceptual place value through mental activities and games in terms of incrementing and decrementing on and off the decuple (a *decuple* is a

multiple of ten e.g. 10, 20, 30 etc.) and incrementing and decrementing through 100, 200, 1000. For Aspect D we focussed on mental facility and development of strategies for working with numbers to 100 (and over) that didn't rely on using the standard vertical algorithms for addition and subtraction. In the second half of the year, we developed the club learners multiplicative thinking (Aspect E) using a variety of array based activities as well as developing their logical thinking skills through an assortment of logic games and puzzles.

Table 8: March test scores for each aspect in Club A.

	March Test				
Learner	A	B	C	D	E
Azi	91%	100%	77%	86%	90%
Lulu	94%	100%	85%	93%	90%
Kayla	100%	100%	92%	100%	90%
Nate	91%	100%	85%	86%	80%
Zac	97%	100%	92%	86%	85%
Thembisa	81%	100%	77%	71%	85%
Zando	94%	100%	69%	86%	85%
Average	92%	100%	82%	87%	86%

Seeing the lower score for Thembisa in Aspect A meant that we could also focus on developing her facility with number words and numerals which involved working mostly with her confidence in 4 digit and fraction numbers which we saw from looking at her interview script.

We can see here how the broad scores enabled us to attend to the club as whole by planning activities that focussed on their needs whilst still being able to drill down to see where individual learners needed help by using the data recorded on their interview scripts.

November

The results shown in Table 7 indicate the scores each club learner achieved for each LFIN aspect in the November assessment. There are more learners in the higher percentage ranges (89% to 100%) and we can see that all learners achieved 100% in Aspect C, which had been one of the areas of focus. Although 2 learners decreased in scores for our other area of focus (Aspect D), the other 5 learners all increased pleasingly. The scores for Aspect E (the area of focus in the 3rd term) were also pleasing (over 90% for all learners) averaging 97% which was 11% up from the 85% average in March. Thembisa achieved 100% in Aspect A. Nate and Zando were the only 2 learners not to get 100% in Aspect A as they gave incorrect number word names for various numbers in their final interview.

Table 7: November test scores for each aspect in Club A.

	November Test				
Learner	A	B	C	D	E
Azi	100%	100%	100%	93%	100%
Lulu	100%	100%	100%	79%	95%
Kayla	100%	100%	100%	100%	100%
Nate	97%	88%	100%	79%	100%
Zac	100%	100%	100%	100%	90%
Thembisa	100%	100%	100%	93%	100%
Zando	91%	100%	100%	100%	95%
Average	98%	98%	100%	92%	97%

March vs. November aspect summary

The benefit of generating the aggregate (or average scores) shown at the bottom of each table becomes apparent when comparing the progress of the whole club across the March and November assessments visually using a graph. The graph in Figure 5 allows us to see at a glance if there has been overall progress in the club for the different LFIN aspects. As discussed above, we can see the most substantial change is in Aspect C, with another big change in Aspect E.

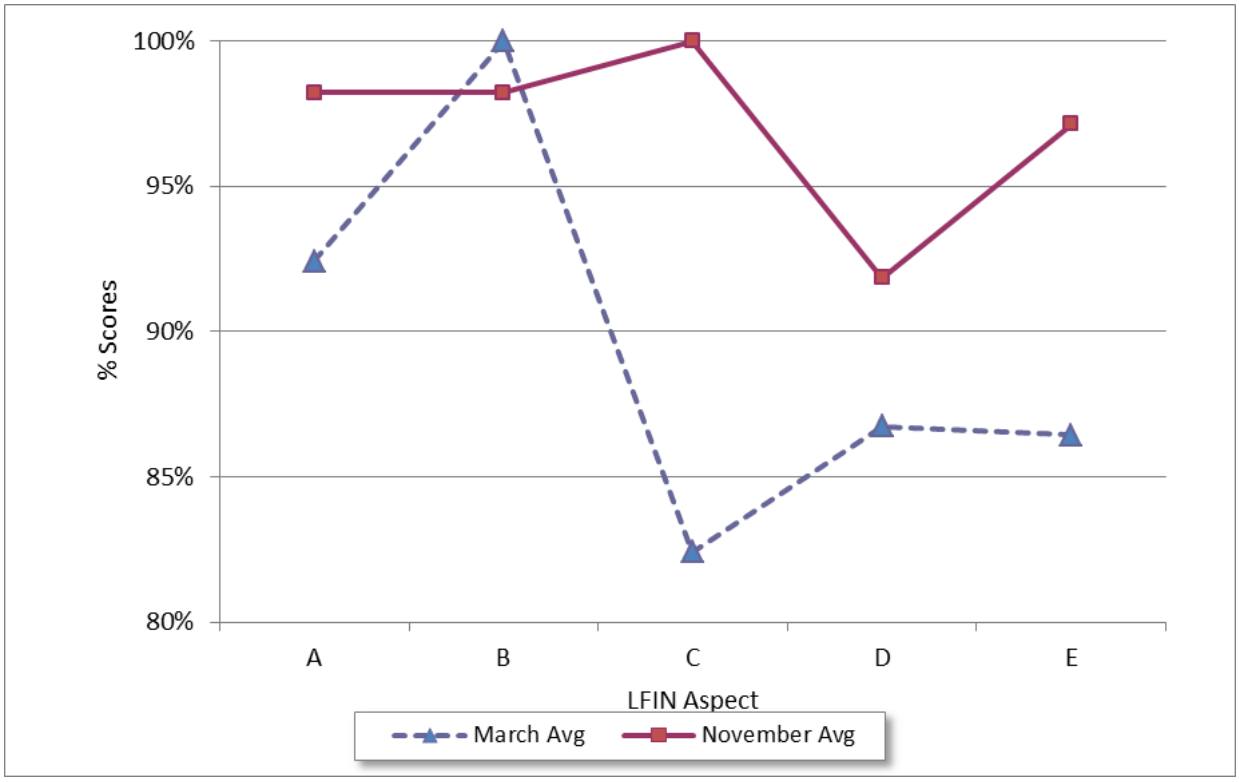

Figure 5: Average percentage score per Aspect for Club A.

Although we have only presented the graph from one club here, we can use the same type of graph to compare the progress of other clubs.

Increases and decreases in scores

The ability to aggregate and count data for the whole club in this manner, provides us with another way of looking at this data from a broad level. This can be done using the matrix shown in Table or a graph such as that in Figure 6.

Table 8: Matrix of score increases and decreases across aspects in Club A

n = 7	A	B	C	D	E
Same score	1	6		1	
Decrease in score	1	1		2	
Increase in score	5	0	7	4	7

By counting the number of learners for each LFIN aspect that have increased or decreased scores across the two assessments or who have the same score for the two assessments, we can see a high level picture of where progress has been made. We see from the matrix that that all seven learners improved in Aspects C and E in November. Four learners improved in Aspect A and D. A number of learner scores remained the same. In many cases this was due to the fact that they had already achieved 100% in the relevant aspect in March. This is illustrated particularly in Aspect B by Thembisa, Zac, Zando, Kayla, Lulu and Azi.

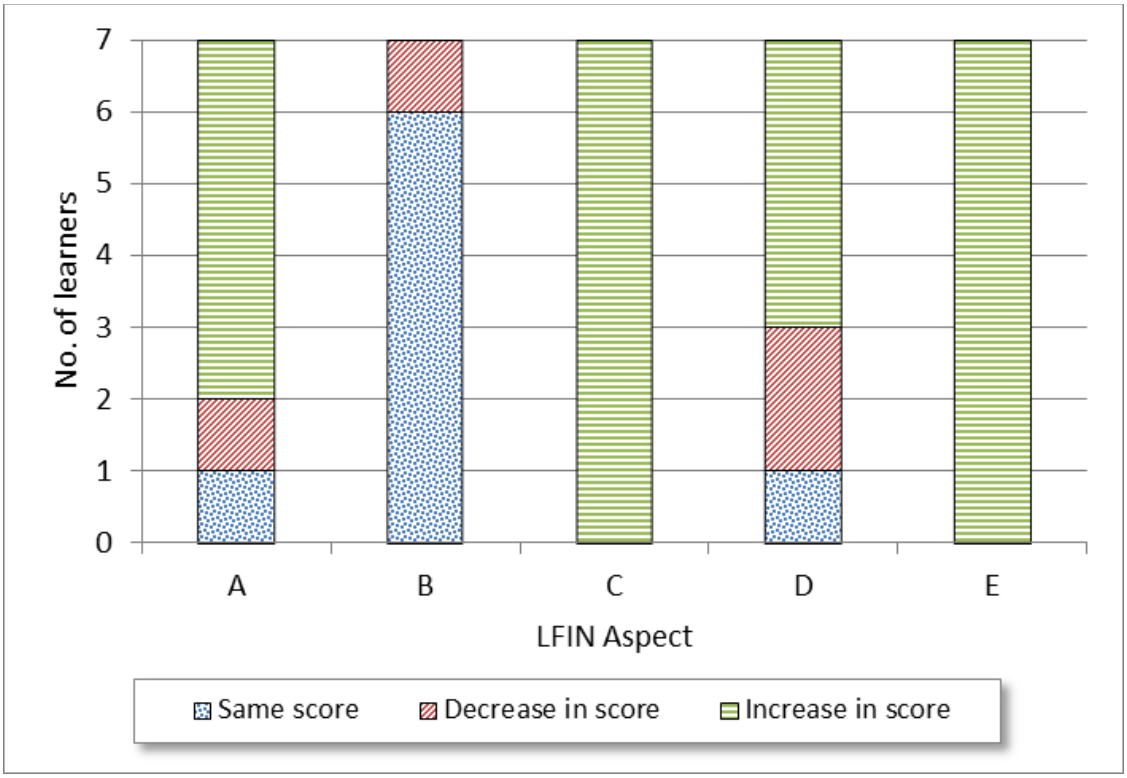

Figure 6: Number of learners with increases and decreases in scores in Club A.

A stacked column graph such as that in Figure 6 visually shows the proportions of learners who have increased, decreased and stayed the same. Using the graph we can clearly see that Aspects C and E have the largest number of learners who increased their scores across the club. Although this graph only represented the data for one club, we have used the same type of graph to compare the increases and decreases in scores for other clubs across the SANC project.

CONCLUDING REMARKS

Although our focus in this paper has been on exploring the usefulness of the quantifiable data generated from the assessment interviews, it is only possible to do so by using the existing LFIN framework as the construct around which all the scores are generated and presented. Thus by using the framework and developing it to include these scores and aggregations, we have enabled a mechanism for ourselves for making sense of the different levels of data and for practically using it to review whole club progress. Additionally, the mechanism helps us to drive forward the club interventions and activities. For us, the LFIN framework is indispensable as it provides us with not only a structure and mechanism for collecting the data, but also for reporting on the data and for planning teaching and learning at both a club and individual club learner level. We hope that by presenting these insights that we can add to the body of work that uses the LFIN and exemplify how it may be used in a wider context than one-to-one recovery.

We hope to report on the more qualitative aspects (levels one and two) of using the Learning Framework in Number in subsequent papers.

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