The [embodied] dance of reduction and adding back the rest of world: Dancing the Dow

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'I am body entirely, and nothing beside; and soul is only a word for something in the body. The body is a great intelligence, a multiplicity with one sense, a war and a peace, a herd and a herdsman. Your little intelligence, my brother, which you call 'spirit', is also an instrument of your body, a little instrument and toy of your great intelligence. You say 'I' and you are proud of this word. But greater than this – although you will not believe in it – is your body and its great intelligence, which does not say 'I' but performs 'I'.

(Nietzsche, 1961 [1883], pp. 61–2)

'….(T)hinking wants to be learned like dancing, as a kind of dancing. ….. For one cannot subtract dancing in every form from a noble education—to be able to dance with one's feet, with concepts, with words: need I still add that one must be able to dance with the pen too— that one must learn to write?'

(Nietzsche, *The Twilight of the Gods*, Section 6)

Introduction

We suggest a pause to bring in Xeder's, (Iran) work from previous exhibitions in Edinburgh and in Tunis (2024) as part of the [Rec]ount – Photography agora project. Presented under 'See the other', his beautiful picture of hands intertwined and holding something together, and his beautiful written words linked to them was an inspiration.

'A reflection on the possibilities of one and one; for fusion and confusions, tension and retentions…contentious and complex relations of affinity and aversion togetherness and separation, likeness and incompatibility between 1+1+1 relations' (p.112)

'Seeing the other' is always an embodied experience, and in the context of the exhibition [Rec]ount it is an experiment, learning to see the other, to trust this 'great intelligence', as a dance, as a movement, in adding the world back. We like to add something more to these movements, build on it, making crossings, pushing knowledge boundaries of what can be seen and known when adding back the world (the other) by dancing Dancing the Dow. In this book chapter we take Nitsche's words on embodiment seriously and explore this point. Let us embrace thinking learning as dance embodied. This book chapter will share an experiment of embodiment knowledge and encourage more to join in. We will take you through the translations into dance and music and its performance on stage.

In an early experiment we simply asked whether we could listen to accounting and did it make a difference how and what we know to which we answered yes *(Bettner et al, 2010)*. We then asked ourselves if we can listen to accounting and finance, can we dance it too? Yes, maybe we can, we said. Let us experiment. Let us add 'the rest of the world' well part of it, in this way. While there are strong arguments for how accounting is

reducing the world, while being in the world, by pointing to its numbers. However, accounting has more than meets the eye, the numbers only tell the half the story. Accounting always simultaneously names and counts Bassnett et al, 2018, Ezzamel and Hoskin, 2002). It is a writing, it is the first writing, and it does not even try to imitate speech and therefore silent, and it does not even have sentences or verbs, but it has syntax (Bassnett et al, 2018; Damerow, 1999). This conceptual position naming and counting is at the same time key conceptual basis of how translating accounting into something else and back is made to happen. In these movements we have also let us translate differently and bring in what we see, hear, feel what we sense and put our embodiment and the moving body at the forefront of this experiment. It is also a form of resistance and ups what Randy Martin (1990, 2012) explored how the financial is already integrated into movements of everyday life and street dance but equally can be a political act. In letting speech derived narrative writing (glotto-graphic writing) (rarely oral due to its lack of durability) 'dictate' the translations of what we read and see, with an ambition to keep associations stable of what we know- this mode of existence - to use inspiration from Latour (Latour 2013), Latour's term), arts are about challenging such notions. Let us use and redirect others forms of translations and ask what we experience and possibly know things differently by dancing, as the dancing subject in the making of the object and vice versa. Let us bring back 'the world' through a different form of languaging act. Hence, the experiment is about Dancing Accounting, more specifically Dancing the Dow. This chapter is about this journey and its outcome.

Further reflections to the [Rec]ount exhibitions project

In the Edinburgh exhibition Xeder's, (Iran) we now see more of his photograph presented in the first exhibition. Hands are now also part of two people interviewed into one by a cloth, one of them is showing a coffee bean to the other. New relations are in play. Adding the 'world' back in this way resonated with us in serval ways not least to continue the 'adding back' but slightly differently and add another way of 'adding back' the world. Anchored in three knowledge disciplines Dance/Chorography, Finance and Accounting Recounting is one of the central concepts that binds us together. We do count to dance, we count in finance, sometime badly, and we count to manage via accounting our organisations, in particular through performance and KPIs, where we can see our worth, in absolute and relative terms, in work life or in learning settings as scholastic accounting, but at the same time always pointing to a future where we must/can achieve more. We report accounts in various statements. They are everywhere today in everyday life and work, and much an integrated embodied way in which we can view ourselves and the world *(Hoskin, 1996)*. Again, Xeder's work comes to mind as per the Edinburgh exhibition under 'Silenced Bodies'. Snared and beaten?! Maybe but also maybe not. The possible organising outcomes could perhaps be different or at least a start of thinking otherwise by adding back the world differently. What is stopping us? Public transport needs their bus stops and its specifics in time and space and can organise a city or even a state of a certain kind if we are lucky (Frandsen & Hoskin, 2023, 2024; Latour & Hermant, 1998;). But is this all? Of course not.

While accounting as always simultaneously visually names and counts, combining pictorial- plus-scriptorial languaging acts, and therefore not just visuals, it is also written languaging act that is performed in silence, non-glottographic, (glotta is tongue Greek) *(Hyman, 2006, Bassnett et al. 2018)* as it does not try to imitate speech *(Bassnett tal. 2018, Frandsen & Kim, 2025)*. I just names and counts, and perform 1+1+1+1… whether it is a second, a lifetime or a dead cow. That is it! Yet so powerful. Here we can link with a second picture and text presented under the 'Silence Numbers' from the Tunis exhibition that of Alex Premoli (Italy). His picture of a room full of shelves with books and a door. We suggest add, the naming to the numbers. In silence they walk side by side and we can look/see/know differently. But we can also rename and therefore also recount what we

Author's of a bus stop in Gothenburg/ Sweden

have named, and yet again 'be the same' anew, a movement we can repeat endlessly 1+1+1+1..., in embodied silence. By naming we make things abstract and therefore already metaphysical in the act of naming. Through the naming act we can make things the same to be counted. We can bring together, and separate and divide. However, while we are most of the time forced to translate accounting into speech derived speakable narrative writing, line by line until full stop, which in a narrow way tell us what we 'see' or orally performed, as is audio, we can translate it into dance to be danced and intensify the embodiment it always is. Each langugaing form has its own path, and interplay with each other, but they say things differently and say different things. It is a perhaps epistemological question perhaps (Damerow, 1999). One of the question it raises is: what else can/will you experience and know when dancing accounting? But in this process let us be brave and experiment with these translations and avoid any glottographic writing as much as possible. Add life back and dance it, force life back on/in// add to it, break it, twice it, jump it, pirouette it, turn it, side step it to the left, down, right and up, lie down, rise, be still, pause, look, see, wave, feel, talk it, sing it, be silent, leave a trace or not, be absent, come into being, seen or invisible, knowing more or less. From silences bodies to dancing bodies embracing life, for and to yourself and others, and as self and as the other. See the world and embrace embodied Experiences anew.

There is no such thing as purely propositional knowledge; part of all of our knowledge is necessarily embodied. That of course include Accounting and finance while not often up for discussion. It's not only a matter of being unable to know anything about the world without our body's senses, it's a matter of being unable to comprehend the world without our body's experiences. Here we find Merleau-Ponty's view in particular interesting, that 'we are in the world through our body and…. we perceive the world through our body' *(Merleau-Ponty, 1962: 206)*, so that each of us—as the 'body-subject' that he discusses in Part One of that book—reaches out to the world through an 'intentional arc', seeking to obtain 'maximum grip' on whatever we attend to, in contexts where our knowledge of the world and our relation to our self is always partial and conflictual (cf. Dreyfus & Wrathall, 2014).

One issue the learner may face when moving the narrative text and to the diagram, and can not find 'the' connections. Moving from the alphabetic method, and it's silly rote learning of sounds to pen strokes, to become literate, and then hopefully jumping the gap of combining both silent consonants jointly with vocals in making 'sounds' of letters, until steady. Of course, this gap is much harder if you cannot hear or are blind. Still, this has not stopped how we teach it, forcing those who cannot hear to speak and read outload while learning the alphabetic method, and forcing them NOT to use their sign language while in school. Suddenly the letters are all silent in the diagram and does not make sense. Their function is now different. The learner cannot see or 'hear', as you cannot map them on to each other. But when they do grasp, jumped the gap, what the figure demonstrating, and the deduction that follows; geometrical 'truths' you can reconstruct what the narrative is 'saying' and supply from going between the figure and text, a quasar explanation of both sets of statements together. But you never close the gap. The next learner in line does it in the same way.

However, there is more to it. How about if you cannot hear? In 1880 The international Education Conference took place in Milan, Italy (Deaf History webpage) where a complete ban on sign language was imposed. In other words, deaf kids were to speak and read aloud [glottographic] writing in the classroom but they could also NOT use their sign langugaging in these spaces at all. With a pen stroke, alphabetically, the classroom was redefined For the benefit of the frustration felt the artist Mary Thornley expressed like this in her oil painting in 1994 (deaf-art.org/profiles/mary-thornley/#iLightbox[gallery_image_1]/0). She likes to define herself as deaf artist. The painting is an inspiration of the painting by Francisco Goya The Executions of the Third of May 1808. Here ASL, which stands for American Sign Language, is instead killed and shot down. Growing up in born 1950 it was also part of her learning experience as many with

her.

Sign language is very much an articulation in the present, that lacks the traditional archives of 2Ds. It is very much embodied. While the hands are important in sign language, and there are letters to be formed by the hand, but it is the whole body that speaks. It is un-reduceable as it is the full body along with the hands that will do the trick. No doubt sign language is a true performing languaging. Our experiment was about what other ways of knowing could and if accounting be felt and experienced and known differently if we changed languaging form? Could the embodiment it always is be intensified? We have translated Dow Jones Index into music to be heard. However, it could also be translated into vibrations to be felt by the body or as they did in the latest Eurovision Song contest using a translator *www.youtube.com/watch?v=-QGmhfpOMxU*.

The experiment of translating and performing accounting and finance as dance

With such translation we engaged with of Dow Jones index from October 1928 to December 1941, i.e. from the last months of the build-up to the Index's high point before the September 1929 Crash (a point not reached again until 1954) to the month that would see Japan's attack on Pearl Harbor and the entry of the USA into World War II. During this period we collected named and counted a series of 159 month-opening values from DIJA. We turned these points into 'music' or sounds. The graph of the DIJA was turned into dance a space for embodied dance movements to this music as its temporal and special guide. My colleague Kelly Knox who I have now contacted, a dancer, teaching and choreographer, then created a dance using the music and the graph with her students who did a minor in accounting and finance. They performed it at the end of the year and this was their achievement. And ours. I hope you like it. This is what I had in mind.

The dissimulative way in which image and text systematically 'say' different things is perhaps best demonstrated by in Magritte's series of paintings 'This is not a pipe' ('Ceci n'est pas un pipe'), and as then analysed by Foucault. At the top of each painting there is always a pictorial image of a pipe, surrounded by a neutral background; below there is a well-formed script which states simply 'Ceci n'est pas un pipe'. So, as Foucault observes, at a formal level Magritte performs with precision the conventional 'informational' move, making 'simultaneously present and visible, image, text, resemblance, affirmation' *(Foucault, 2000: 202)*. But at the informational level, he stops that mutual 'affirmation' of image and text in its tracks. Before Magritte such image-text juxtapositions had declared, as Foucault puts it: 'What you see is that' *(Foucault: 2000: 196)*. But now 'painting has stopped affirming' (2000: 202). For 'these few millimetres of white, the calm sand of the page' become 'a crevasse…now dividing the pipe floating in its imagistic heaven from the mundane tramp of words marching in their successive line'.

What then opens up is the whole relation of embodiment to thinking, to knowing and to acting in this knowledge world of image-text convergences. We suggest that getting clear about the interplays involved between embodiment and the visual involves an appropriate thinking both of the form taken by the objects that we view at any given historical era, and of the locations or 'subject positions' from which we view them.

The process whereby we first found ourselves thinking that accounting just might be translatable into dance was far from straightforward. In one way, it appeared a form of 'logical progression' beyond the Bettner et al (2010) idea of 'listening to accounting': i.e. if music, why not dance? But then: why the leap to dance specifically? Considered this way, the transition now appears to us as more what Michael Polanyi described as jumping a 'logical gap' *(Polanyi, 1958: esp. 150-60)*: i.e. passing to a new way of acting or of thinking which was not previously part of "me" but now becomes "me": as when, he argues, scientists take an intellectual leap to a new conceptual framework, where they 'think differently, speak a different language, live in a different world' (1958: 151)[1].

One of the authors, had a university colleague, Kelly, who taught and researched choreography and dance. She read

[1] He also suggests that this is a matter of 'intellectual passions': in which case, we may understand why this felt so exhilarating: literally an 'in-spiration', as something new being 'breathed in' to us and changing the intellectual air we breathe.

'Listening to Accounting' and the rough-draft ideas that we had on translating accounting into dance, including the possibility of making conceptual as well as practical connections between the two fields. The mix of the practical and conceptual excited her, and she agreed to join the team. Further, she suggested that a first practical objective we might work towards was a performance of Dancing the Dow in the university's annual Choreographer's Showcase. That would also, as she then wrote in an early reflection on the project, would open up the possibility of 'exploring the theories': which for her was the 'much more interesting challenge' (Bettner et al., 2010).

The first contact with Kelly regarding the dance was made in July 2009. With the Showcase planned for 31st April and 1st May 2010 there were not much time[2]; and she saw two major issues to resolve first. One was to decide on what type of dance, with what dancers, this dancing of the Dow should be. The other was to figure out how to construct a form of 'dance statement' which would both represent faithfully the flow of value points to be danced and, in the translation into dance, enhance our perception and understanding of the Dow as 'value statement'.

Part of the authors had in advance already created the 'music' to use for the dance. It was created by the algorithm from the Eastern Washington University website, *musicalgorithms.org/4.1/app/* (see note 3 below), to compose a musical version of the 159 Dow value points from 1 October 1928 to 1 December 1941. Below you find extracts from the collected series here from 1st October 1928 to 3rd September 1929. Please remember that these numbers are already named. Monthly average index in this sense it is a meta composite accounting naming and counting statement, with layer after layer of accounting naming and counting translations, into new value packages, and not least as 'money account', and has been since its first emergence in ancient Egypt *(Ezzamel and Hoskin, 2002)*.

That version had, as form of 'musical statement', taken the path of starting with a slow tempo, long silences and short, almost pianissimo notes to represent the rise to the market top in September, 1929.It had then gradually speeded up and grown louder as the market went through its first major fall to early 1930, had recovered and then fallen again, particularly after the March 1931 suicide and bankruptcy of Ivar Kreuger, the Swedish 'Match King'. Finally, it went still faster and faster through the phases of the Great Depression, as market trading was unable to bootstrap its way out of the slump, bumping along with no recovery, up to the US entry into World War II[3].

Kelly was provided with this music version, plus a graph of the Dow movements generated by the algorithm (see below, Figure 1), and an Excel spreadsheet of the Dow that listed the closing values on the first day of every month from October 1928. She then began work on producing a dance version which would (a) accurately reflect the index's value movements, (b) be danceable, and (c) enhance our ways of seeing and understanding the Dow as value statement. At the same time, she had the opportunity of working with someone who had accounting expertise as well as an understanding of the project's dance demands—a student, Angelica, who was doing a major in management and a minor in dance. So Angelica came on board as assistant choreographer on the project[4].

[2] As seen by the advert *www.bucknell.edu/x61451.xml*

[3] This could of course also have been portrayed in some other way. For instance, if keying on share trading volume, it might have begun with a fast and frantic crescendo to the initial Crash when volumes were regularly 4 or 5 million,, and then led to a tailing away and diminuendo into the Depression, when volumes typically averaged around 1 to 2 million or lower (for instance for five consecutive months in 1934 volumes were under 1 million). We see that as underlining the interpretive range that such financial events allow.

[4] As one with 'expert' knowledge in accounting and finance Angelica assisted Kelly in reading and interpreting the Dow Jones graphs and actively in forming possible dance moves. After graduation Angelica started working for one of the Big 4 in NYC where she still is employed.

	317,51	267,14	169,34	76,55	60,90	107,22	101,69	149,49	184,74	121,87	143,76	145,33	124,13
	317,41	271,11	190,34	81,44	51,39	103,46	102,38	152,53	187,17	129,64	147,30	146,54	121,97
	308,85	286,10	172,36	73,28	55,40	100,31	100,78	156,34	186,41	98,95	131,84	147,54	122,72
	319,29	279,23	151,19	55,93	73,10	100,49	109,45	145,67	174,27	111,66	128,38	148,43	115,54
	297,41	275,07	128,46	44,74	88,11	94,00	110,64	152,64	174,71	107,74	138,18	116,22	116,23
	331,65	226,34	150,18	42,84	98,14	95,75	118,36	157,69	169,32	133,88	130,63	122,06	123,14
	347,70	233,99	135,39	53,89	90,77	88,05	126,23	164,86	184,01	141,20	143,26	126,14	128,79
	380,33	240,42	139,41	73,16	102,41	92,86	127,35	166,29	177,41	139,27	134,41	128,88	127,43
	343,45	204,90	96,61	71,56	94,24	92,49	131,92	167,82	154,57	141,45	150,16	132,64	126,82
252,16	273,51	183,35	103,97	61,90	88,16	93,36	139,74	177,15	138,48	151,73	151,88	134,61	117,82
293,38	238,95	180,91	93,87	56,35	98,14	102,94	142,34	183,22	123,48	149,82	145,69	130,03	114,66
300,00	248,48	164,58	77,90	60,26	98,67	104,04	144,13	179,90	120,85	154,36	149,99	131,13	110,96

Table: Monthly Average index from DJA, collect by Elton McGoun

The two of them began by taking the numerical values for the 159 data points and inputting them into the same music algorithm, this time transposing the data points into a set of piano notes with specific durations.

This derived sequence of notes, now consisting of the 88 notes on the standard piano, became the basis for a new music version[5]. Kelly and Angelica then decided to construct a dance which would reflect the visual graph form of the Dow, starting from the convention (in alphabetic cultures) where the x-axis portrays time as moving from left to right while the yaxis portrays values as increasing upward and decreasing downward. The dance could then move from audience left to audience right (i.e. stage right to stage left) so as to mirror the familiar representation of elapsed time while higher and lower dance positions could mirror the value fluctuations.

Here the graph of the Dow generated by the algorithm (**Figure 1**) was particularly useful in visualizing how to capture possible movement intensities to be captured in the dance flow, as well as in helping decide how each series of adjacent Dow values might best be translated into a series of musical note intervals.

The next step was to link the music and the dance moves representing the movement of the value points, to create a systematic choreographic schema. Kelly had a potential dance group of 7 female dancers from her classes, and her basic idea was that they should execute moves clearly and accurately representing the movement of the value points across the time period selected, successively entering stage right and exiting stage left so that the audience would perceive the time line. But to choreograph a dance that would meet the above objectives while constituting a dramatically engaging 'dance statement' involved trade-offs.

First, she and Angelica decided to have each dancer enter singly but consecutively, so that each represented a single

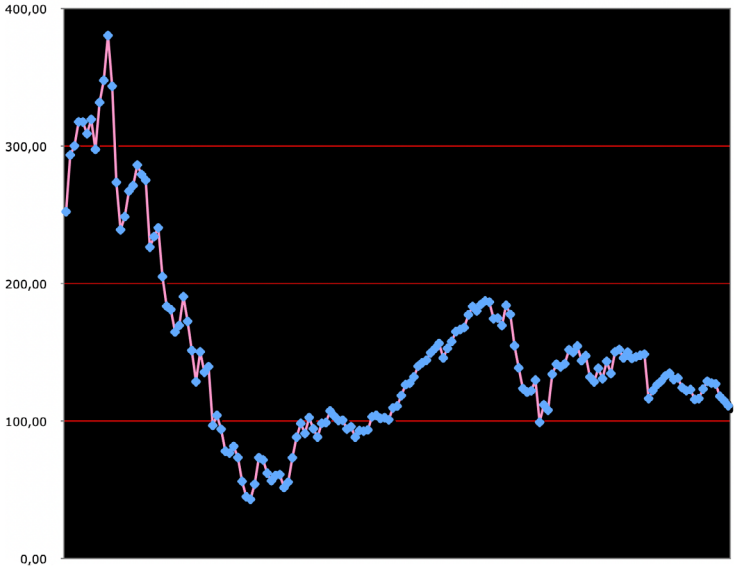

Figure 1
(The authors will happily provide the data points and the algorithmic translation process to interested readers.)

phrase of sequential data points, and the group as a whole conveyed the overall 'value flow'. They then decided that each dancer should dance 20 value points, so that the time period covered would be the first 140 of the 159 monthly value points beginning from 1 October, 1928. They decided as well that the tempo of the music should not speed up, but keep a regular beat to reflect the 'real time' flow of months. This would firstly enable accuracy in the representation of the shifts of value points within each phrase of sequential value points, and secondly enable the dancers to portray patterns individually within their respective phrases and in relation to one another when moving across stage together.

To bring this latter possibility out more, they decided to have the dancers run through their 20 point phrases more than once. So once a dancer had completed her choreographed dance phrase, she had to exit stage left, run round the back out of the audience's sight, and start again from stage right. This process continued until the sequence of **140** notes had finished, which took 2 minutes and 49 seconds, at which point the entire sequence of dance would finish too. To accomplish that, the

[5] We choose to use pitch values correspond to the keys of a piano and are limited to a range of 0 to 88, whereas this is not necessarily true of the values output by the algorithm' (*musicalgorithms.ewu.edu/learnmore/norm_pitch.html*). `

dancers had to speed up as the dance progressed. Taking choreographic license, the 7 dancers began to move across stage in an increasingly overlapping chronological order, so that phrases 1 to 7 began to potentially reveal different 'value relations' with each other, as well as producing combinations that made visually and kinesthetically interesting patterns.

Two particular problems emerged. The first concerned ensuring that the traveling patterns of the different dancers across the stage maintained a separation between each. Here the characteristics of the dance stage made a further translation possible. In addition to working with an x-axis for elapsed time and a y-axis for depicting height/value relations, it was possible to generate a z-axis (see **Figure 2**) representing the depth of the stage from upstage to downstage.

This could then be used to represent different value levels of the Dow (consulting **Figure 1** again, these panned out roughly as 'above 175', '175 to 125', 'below 125'), which were then drawn as 'connect-the-dots' lines on the floor crossing the stage from left to right. However, this was not straight forward for the

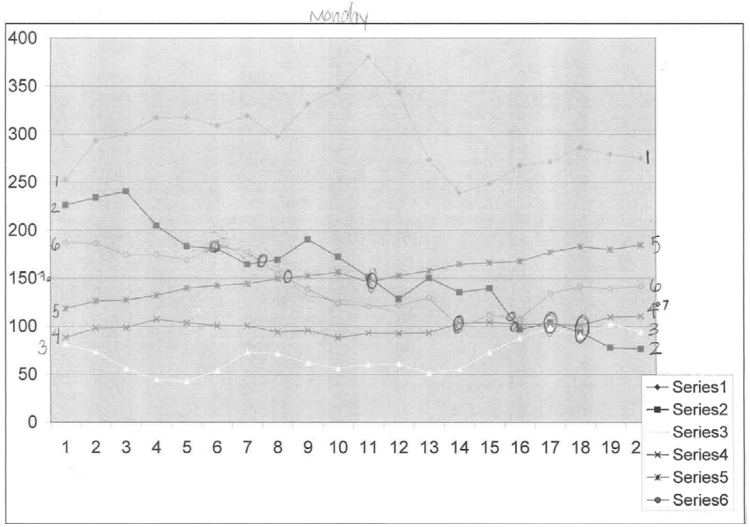

Figure 3 : Six lines dancer's linear path across stage as a 20 weeks line

dancers because the element of time consistently moves in one direction from left to right— the dancers would have to complete their phrase traveling from left to right across the space and then run backstage to make the next pass.

In the choreographic process, Kelly took the financial graphs across a period of 20 weeks where each of the six lines line represented a dancer's linear path while each point had a distinct movement and level: e.g.

This device created three different stage zones where adjacent dancers could pretty successfully avoid taking each other's space. Those dancing a phrase from 1928-30 where the highest average value levels clustered operated around the line furthest upstage and were followed by those dancing the lowest average values from 1930-1934, with those in between coming last. So, within their respective zones, each dancer could move moved closer to and away from the audience as she crossed the stage, corresponding to the highs and lows of the particular segment she was dancing. In other words, the graph of each of the 20 data points also became a map on the stage that determined each dancer's path across the stage.

The most challenging aspect of the choreography, however, was managing the height issue posed by the y-axis. Looking at the extremes in the graph, it made sense that the high values that came early should be danced by the tallest dancer. But the limitations of the body had to be taken into account in scaling the original Dow values (a market high of 380 and a market low of 43) to what was danceable. The maximum height would be the highest point in space that the tallest dancer could reach by jumping while the minimum height would be lying flat on the floor. This gave about six and a half feet, or 88 inches, of space into which to fit the entire range of data.

Here the music algorithm again came to the rescue, through its facility for 'squeezing' raw data into the 88 notes on the piano. So once the value points were normalized to 88 numbers, each value point from 1 to 88 could be assigned a height-specific movement, with the highest movement being numbered 88

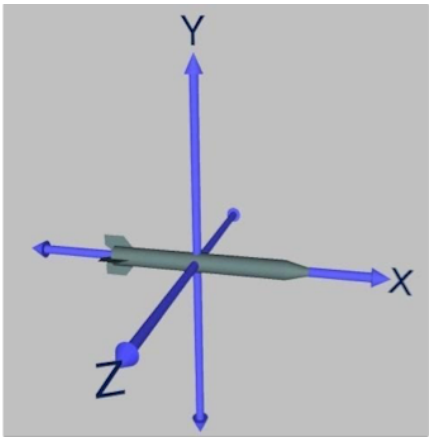

Figure 2
Adding in stage depth via a z-axis

and the lowest numbered 1. Any sequence of individual movements could then be pieced together to create a definitive 'dance phrase'.

Kelly and Angelica did all those using notes and homemade charts to graph floor patterns and to draft moves that that would reference the 88 different dance moves. So for example 88 was 'jump up with arms stretched straight up to ceiling', 87 was 'jump up with one arm stretched up to ceiling', while near the other end 5 was 'crawl on hands and knees in "table top" position', and 3 was 'lie on right side with legs extended in right angle "pike". These notes and charts were then used in the rehearsals as a way of ensuring movements stayed 'true' to representing the information in the value points.

However, as rehearsals progressed a glitch appeared, as it was realized that one value-point at the bottom of the range had been missed. So the question arose of how to represent a value below that which had already been assigned the movement number 1, given that this was already embodied in lying flat on the floor. What should they do with this enigmatic value that could have no 'number' assigned? Possibilities considered were to turn out the lights, have the dancer run off stage, or have her cover herself under a black cloak, but these solutions all created choreographic difficulties. In the end, it was resolved that the value with no number should be represented as absence of both movement and number. So the dancer froze movement by standing immobile, and spoke the absence of number by saying 'ZERO'.

Thus, the dance took shape, with the usual last-minute panics as opening night loomed nearer. Finally, the dance went live 9-10th April 2010 at the Choreographers' Showcase delivered by the Department of Theatre and Dance at XX University, USA, and, to our pleasure (and relief), the performances were enthusiastically received by the audience, while the event was filmed and placed on YouTube and available at the end of this section[6].

We were amazed; it had proven possible to dance accounting! We had taken the naming and counting that constitutes an accounting-based value statement and translated it into a value dance: starting from the embodied intelligence that constitutes market activity and analysis, and so incorporates the production of visualisms like the Dow, we had jumped the logical gap from conventional theoretical and practical understandings of accounting to reconstruct the Dow in the embodied intelligence of a dance statement. Certainly, it was hard work, conceptual and physical, at each step of the way; certainly ,the process was not perfect; and the translation achieved, such as it was, opened up new questions and possibilities. The translations are still on the move: as perhaps the following reflections indicate.

First Kelly had some practical as well as theoretical reflections, as choreographer, in the aftermath of the process, as follows:

'In conclusion, the process of exploring these theories was much more interesting than the choreographic product. On the other hand, having been through the process once, I have discovered new and more efficient approaches that I would employ to create an entirely new dance using the exact same data. For example, I would make the 88 movements assigned to the 88 notes more interesting and unique (using less generic movement vocabulary in the schema). Furthermore, I would employ more than 140 data points so that each dancer would learn more than one phrase of movement and would have a different sequence or phrase each time she came across stage; and finally, I would have the music played live so that the musician and dancer could work together for a more synchronized auditory and kinesthetic experience. Overall, it was a fascinating project and one I hope to investigate further in the future. Thanks so much for introducing this wonderful connection between accounting and dance.'

Reflecting on the embodied project

Further reflections have come to us with the passage of time. First, we would note how similar in form and process the construction of this translation of the Dow into dance and the typical ways of constructing more familiar financial meta-statements from the Dow. A typical first step in the latter is some form of

Dancing the Dow

www.youtube.com/watch?v=QB6CFEkQo1k

[6] Those relishing a challenge are invited to dance the Dow themselves.

normalization or regularization of the 'raw' Dow value statement data, and a second is some re-visualization of its visualism (a re-graphing, a translation into graphs plus charts): at which point the process can begin of bringing out newly visible regularities and anomalies through the particular meta-statement then articulated.

All these steps were integral to dancing the Dow. There was first the normalization of the value points both to musical notes and then to dance steps/positions through the use of the music algorithm. Here normalization was explicitly required, since each user is asked, when entering the raw data, that both 'pitch normalization' and 'duration normalization' be specified[7].

There was then a revisualization of the visualism through charting positions, moves and traveling patterns. Kelly observed that while they did not use a traditional notation such as Labanotation (which is complex both to inscribe and to read), their second step was to construct 'notes to graph…. the path the dancers would take to cross the stage', plus 'notes and homemade charts to draft moves that would hopefully reference the increments of levels of music'. This was essential in order 'to sketch out choreographic approaches so we were prepared for actual rehearsals with the dancers and so that the movements stayed "true" to representing the information of the data'. Then, in the dance as in conventional meta-analyses of the Dow, the process of articulating this particular meta-statement and so potentially bringing out newly-visible regularities and anomalies could begin.

So, our first reflection is that these apparently different forms of 'knowing' the Dow have close affinities, and are even, in terms of form and process of construction, homologous. Given that, we are led to a second reflection: namely that, in 'knowing' the Dow in this dancing but homologous way, we perhaps give an extra edge to Nietzsche's observation: 'in "knowing" I dance my own dance'. For here perhaps 'in "dancing" we may better 'know our own knowing', to the extent that dancing's mix of the visual and embodiment succeeds in extending our ways of thinking 'the financial'. Turning each 2-D value point into a 3-D embodiment of the visual potentially brings out of concealment how the production of each and the flow from one to the next is a continual interplay of embodied intelligences, making trades and counter-trades, sending, receiving and evaluating 'information' which may be mis- or dis-information, deciding next steps while tracking market movements.

Thus, the embodiment of the 'disembodied' points on the Dow Jones graph materializes, which potentially extends our knowing insofar as that day-by-day, now 24/7 and global, interplay is for the most part very much what Dreyfus describes as the playing out of moves and countermoves involving a total embodied yet intelligent involvement, as in the skilled tennis player's movement to intercept and return the oncoming ball. Reflective analysis is not ruled out—indeed reviewing your performance, perhaps to continue as before, or perhaps to refine or radically remake your moves, is integral to trading and dancing the Dow. But engaging in the market dance is first and foremost a matter of thinking and acting 'on the hoof': 'going with' the mis/dis/information flow, seeking to catch the rhythms, tones, harmonics and discords of the music the market is currently making, and to dance the appropriate dance to it.

Finally, relocating the 2-D visualism of the Dow into the 3-D visualism of the stage may bring out 'hidden depths' in its value statements: and in so doing it may produce, as theatre is often said to do, a 'tear in the fabric' of existence, in this instance in that neutral background of the graph, which after Magritte and Foucault, we may see equally as 'crevasse'. We think here of the way that the Dow's conventional 2-D representation is extended through the use of the stage's physical depth, so that diverse patterns of value fluctuation can be made present in the dancing act, instead of having to be the subject of separate analysis, whether by chartists or financial researchers. Beyond that, the dancers here execute a more familiar theatrical 'tear in the fabric' of existence, as they exit stage left and then 'magically' re-appear stage right, utilizing the neutral backdrop of the stage as cover for their ruse.

Then there is that glitch when Kelly and Angelica discovered

[7] The instructions state: 'In order to compose music, raw values output by the algorithm need to be adjusted, or 'normalized', so that they can be interpreted as music notes. The purpose of this step is to convert each raw value into the pitch of a note. This is required because pitch values correspond to the keys of a piano and are limited to a range of 0 to 88, whereas this is not necessarily true of the values output by the algorithm' (*musicalgorithms.ewu.edu/learnmore/norm_pitch.html*). A similar statement is then made regarding 'duration normalization', with the explanation that: 'The purpose of this step is to convert each raw value into the duration of a note. This is required because duration values are limited to a range of 0 to 5, whereas this is not necessarily true of the values output by the algorithm.'

a value point below that already assigned to lying flat on the floor, the lowest possible positive movement, and translated it into both absence of movement, with the dancer standing still, and absence of number, in the form of the 'Zero' that she speaks. Perhaps there is just a little added 'tear' in the fabric of the Dow's financial numbers here, for the anti-number 'zero' transgresses against the Dow's value points, which, whatever their rises and falls, are always positive. But at the same time, there is a particular point to naming this value as 'zero', insofar as it is the zeropoint after the 1929 Crash from which the Dow would move forward in an ever-upward direction: slowly at first, given that it was 1954 before 1929's market-peak value was surpassed, but onwards now to peaks that now near 19,000. In that respect, the value-point translated into absence of movement and number is a positive nothing: a low-point that is now for market participants inconceivable.

What now?

Even if a skeptic is willing to concede that there is such a thing as embodied knowledge along with the more familiar propositional knowledge, it is still too easy for that person to imagine dance at one end of a continuum in which embodied knowledge is important (after all, dance certainly seems to be all about the body) and accounting and finance at the other end in which knowledge is purely propositional and embodied knowledge is irrelevant. This chapter has sought to expose the errors in that image. Embodied knowledge is a necessary part of all of our knowledge. It's not only a matter of being unable to know anything about the world without our body's senses, it's a matter of being unable to comprehend the world without our body's experiences. We graph accounting and financial statements in order to transform named numbers into physical objects. We do not then just read and interpret graphs, we viscerally relate and react to their shapes as we would to other physical objects in the world. And if for this reason graphs enable us to make better sense of numerical data, there is every reason to expect that music and dance will as well. The dominance of the visual in our modern culture has not reduced the importance of the aural and the kinesthetic senses, it's simply blinded us (a telling metaphor itself) to their importance.

As intriguing as this experiment choreographing the DJIA has been, there is, of course, considerably more work to be done to determine whether music and dance can indeed enable us to make better sense of financial information. Although there are few of them now available, there are countless algorithms that might be written in the future for the translation of financial information into music and/or real or animated dance. And in each one of them, there are countless input settings for its conversion parameters. This problem, however, is not insurmountable. It has already been addressed for graphics; there are many types of simultaneously named and counted events and variations. It's simply a matter of sufficient effort being devoted to the task. A more serious problem, though, is how the non-visual senses have been forced into the background in our culture and more specifically in our educations. We not only do not consider embodied knowledge to be as important as propositional knowledge, but we also do not consider embodied knowledge to be knowledge at all. We believe we know what graphs mean when we have transformed accounting and financial writing into 2D, but we are wholly unaware of what music or dance from the same origin might mean. We are completely unequipped to interpret them as knowledge. We can not tell whether he experiment dancing the Dow enhanced the choreographers', the dancers', or the audience's understanding of the Great Depression.

Any notion that musical and dance 'truth' are captured through representation or as representation becomes an object of concern and conflict. In just the way that art begins to resist and transcend perspectival representation, representation as the truth of music and dance is seen as an illusion and suspect. 'What you see' is not 'that', but a simulacrum; the insistence that you see this is a deception. The limitations of a notational 'truth regime' become resisted and transcended, with such resistances and transcendences always being both practical and conceptual.

So for instance 'classical' composers like Schoenberg begin to resist and transcend the 'tyranny' of the 'western' tone plus semitone scale; while choreographers like Martha Graham stretch the limits of 'classical' ballet, so that dance will, as Randy Martin (2012) notes, then transcend the 'tyranny' of the vertical plane of the spine. Then John Cage, for instance, transcends the 'tyranny' of music as notated sound through his 1952 work 4':33" ('Four minutes, thirty-three seconds') where the only sound to be heard is the ambient sound of audience and auditorium.

At the same time, the choreographer and dancer Merce Cunningham (Cage's partner), develops the tactic of 'choreography by chance' where devices such as dice would participate in the composing process. So for instance he has each die face represent a dance movement (e.g. travel, jump, turn), so the roll of the die determines the series of dance movements, as in his 1952 work Suite by Chance. Through such tactics he also destabilizes other aspects of dance. Moves made by chance undermine the idea of 'dance as story or plot'. Casting the I Ching with coins or sticks can determine which dancers dance which roles, destabilizing 'star' status, or even excluding a 'star dancer' completely *(Cass, 1999: 157)*.

But we should also note, if we are to comprehend the full development of the modern epistemological frame of these knowledge fields, how music and dance also gain a foothold as knowledge disciplines within the academy, and so develop their own research discourses and traditions.

Thinking the knowledge world of accounting statements and financial markets. No reading of its image-text statements can afford to take things at 'face value'. They may be conventionally referred to as carriers of 'information', but their initial status is undecidable: information, but equally possibly mis- or dis-information. Nietzsche's observation: 'in "knowing" I dance my own dance'. For here perhaps 'in "dancing" we may better 'know our own knowing', to the extent that dancing's mix of the visual and embodiment succeeds in extending our ways of thinking 'the financial'

As this chapter has asserted, we cannot just see something. What we see triggers experiences during which our other senses have been activated as well. When we look at a financial statement or read an annual report, we do so with synchronesthetic or cross-modal perception, although we are not consciously aware of it. We hear it (or feel it?) and touch it and move to it as well as see (or feel) it. When we talk about accounting and finance, we do so not in a pure propositional language, because there is no such thing, but languaging takes many forms that say things differently and say different things, but all depends upon our bodily experiences to make sense of what is 'said'. There is already more to accounting and finance than literally "meets the eye," and the frontiers are not even in sight. We would encourage further experiments in the same spirit, and we would suggest using the financial crisis of 2008, and perhaps too dance the latest world's countries Nationally Determined Contribution, both with music to hear and feel, and with sign language. Such art project can challenge what can possibly be added to the rest of the world and what we can possibly know.

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