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New Vistas | Policy, Practice and Scholarship in Higher Education

EDITOR'S NOTE

Volume 2 | Issue 1

The University of West London's journal was founded to showcase research and scholarship produced by the academic community (staff and students) in a modern university. The Editorial Board is keen to ensure that *New Vistas* focuses on varied types of scholarly outputs that reflect the University's intellectual, social, and economic contribution to the sector, as embedded in its mission 'to raise aspirations through the pursuit of excellence'.

The spring edition of *New Vistas* provides an opportunity to publish work from both the 'soft' and 'hard' sides of knowledge. Some articles focus on discursive or developmental subjects like teaching, writing, marketing, developing people; others on systems that underpin economic or scientific progress – information technology; aviation economics. The authors present research in the discipline they teach, or enquiry into how they teach it. In all cases, they seek to highlight the applicability of the scholarly endeavour to industry, commerce, practice, and development.

In this issue, three contributions feed directly into a reflection on enhancing teaching and writing. Hine and Northeast explore the potential of formative feedback to enhance student performance and Hunt *et al.* discuss why it is important to consider 'mental toughness' as a learning attribute. Barnett, on the other hand, explores the conditions propitious to becoming an academic writer and provides advice on how to develop 'writing discipline'. Through musing on 'what's in a snack', Strong provides a spirited reflection on food safety and culinary cultures. Papatheodorou and Poulaki's paper examines the opportunities afforded by air transport liberalisation for remote regions of the world. Ruizalba reflects on how to strategize workforce development, and Mohamedali reviews the potential (and challenges) of using 'big data' to enhance healthcare.

On its first anniversary, *New Vistas* is welcoming additional reviewers whose contribution is acknowledged in this issue. We always welcome applications to review work submitted to *New Vistas*, and any expression of interest should be directed to the Editor.

Professor Joelle Fanghanel
New Vistas Editor

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The spring edition of New Vistas *provides an opportunity to publish work from both the 'soft' and 'hard' sides of knowledge*

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New Vistas | Policy, Practice and Scholarship in Higher Education

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Ronald Barnett | University College London Institute of Education

A WILL TO WRITE

That blinking cursor demands words from me

I am something of an old-fashioned scholar (well, some might think that, I suppose) and have a library of my own, accumulated over the years. As it happens, as I write this, there is literally in front of me a group of books on writing. None of those books is one of the standard texts on academic writing. Rather, they are an eclectic group and include books such as *Why I Write* by George Orwell, *The Writer's Voice* by Al Alvarez, *The Pleasure of the Text* by Roland Barthes, *This is not the end of the book* by Umberto Eco and Jean-Claude Carrière and *Rethinking Writing* by Roy Harris. That I have such a group of books on my shelves, and that they should occupy such a central position, perhaps says two things about me. First, that writing as such is important to me; and secondly, that I see academic writing as a kind of writing as such. That is, that what is important about academic writing is that it is a species of writing.

Does that need to be said? I believe that it does. We have, I think, slid into a sense that academic writing is not really a form of writing. It is not a form of communication that needs to be cared for and cared about. It is simply a technical matter, of conveying formal propositions, the understanding of which will be readily intuited by the reader. As such, the writing, as a complex craft with its own challenges of articulating meaning and effecting communication, fades from view as a matter deserving of attention in its own right.

Even while I was a teacher, researcher, scholar, administrator, senior manager and holding leadership positions and fulfilling a range of consultancy roles, I saw myself as a writer. Not as an academic writer but as a writer. That was and remains my primary identity. I believe that this is unusual among academics. I believe that, if asked, few academics would use the unadorned noun 'writer' to describe themselves. Indeed, writing is rarely a matter of debate among academics. It is very rarely discussed. And yet there is all manner of difficult issues in front of academics-as-writers, which therefore go unspoken and even unrecognised.

I want, in this article, to tease out some of these challenges. I also want to show why I think that writing is important for academic life and should be understood to be rightfully challenging and, thereby, why it is deserving of explicit attention.
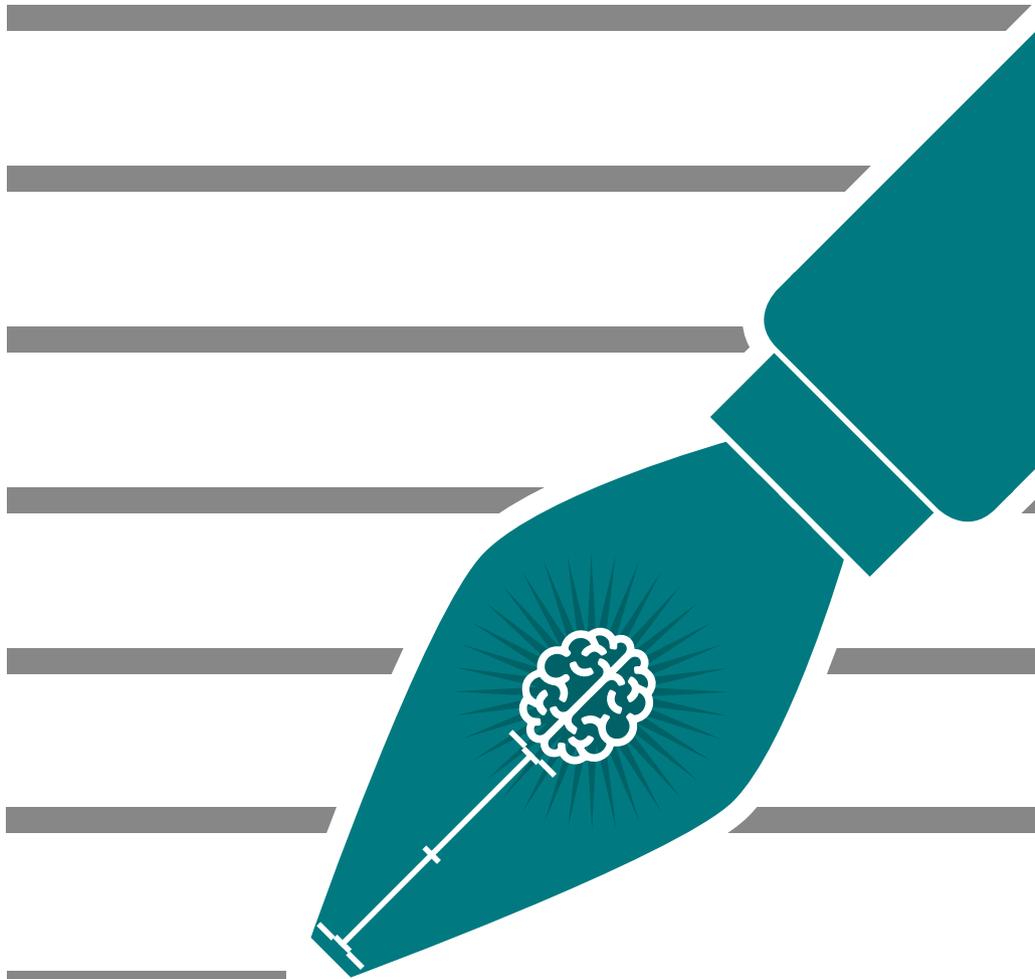
Even while I was a teacher, researcher, scholar, administrator, senior manager and holding leadership positions and fulfilling a range of consultancy roles, I saw myself as a writer. Not as an academic writer but as a writer

Why write?

In the book of his that I have just mentioned, George Orwell suggests that there 'four great motives for writing'. He adds 'at any rate, for writing prose' but I want to ignore that rider for his points are pertinent here. His four motives are (in brief):

(1) 'Sheer egoism – desire to seem clever, to be talked about, to be remembered after death, to get your own back on grown-ups who snubbed you in childhood [...]

(2) Aesthetic enthusiasm - perception of beauty in the external world, or, on the other hand, in words and their right arrangement [...]

(3) Historical impulse – desire to see things as they are, to find out true facts [...]

(4) Political purpose – using the word "political" in the widest sense; desire to push the world in a certain direction, to alter other people's idea of the kind of society that they should strive after [...]'

Being open with the reader, Orwell observes of himself that he is 'a person in whom the first three motives would outweigh the fourth'. For myself, I would say that all four motives are at work within me, in energising my writing efforts. It will have been noticed that, in Orwell's list above, motive (1) contains four exemplifications – and again I would have to testify at least to the second, third and fourth expressions of that particular motive being present within me. To avoid the risk of further embarrassment, I had better leave that matter there.

I would just, though, add a *fifth motive* to Orwell's list, that of a 'communicative impulse'. One cannot hope to take the mind of the reader onwards unless one is also determined to write in such a way as to communicate one's thoughts as clearly as possible to the reader. The good writer, accordingly, will have a deep concern to reach out to her or his potential readers, and will write very consciously for her/his particular audience(s).

I would also make an observation about the order in which Orwell has placed his motives. For me, number (3) comes first. That is to say, one's writing is fuelled by a concern with some matter in the world and a determination to set the record straight in some way. I put the point slightly extravagantly deliberately.

A 'matter in the world' might be a point of view or a position or a debate in the contemporary literature; it might be a situation in professional life or, say, a government policy that bears upon that professional life; or it might be an idea or a concept that has occurred to one that appears to have some significance beyond itself. And 'putting the record straight' means here getting to grips with the issue that one has identified and wrestling with it to the best of one's ability.

The point here is that unless one has something that is gripping one and which one wants to resolve in some way, one's writing will be lacking in energy and in direction. The other four motives (Orwell's plus my own addition) – advancing oneself, caring about writing as such, wanting to change things in some way and being determined to communicate – are empty and will lead to shallow writing unless they come into play in the service of one's wanting to grapple honestly with a significant issue.

Why is this last point important, as I believe it to be? Until quite recently, say around forty years ago, even so-called elite universities conducted relatively little research. Largely, academics taught and would write only occasionally. One could gain the title of 'Professor' without a higher degree and on the basis of just one or two papers. Now, academics in many universities – both older and newer – are expected to produce papers and to gain their publication in (leading) journals. Expectations to write come upon academics from beyond themselves – from their own institution, from their peer group and from tacit international norms represented in global league tables. There is, then, a tendency for writing to become an externally imposed form of academic labour. In turn, it is hardly surprising if all too often academic writing becomes somewhat lacklustre, with abstracts populated with verbs such as 'discuss' and 'explore', intimating the fare to come; namely, simply an exploration of the literature and issues on a particular topic, which, in the end, amounts to very little.

Saying something and something to say

Good academic writing, accordingly, should be saying *something*. An academic who turns to writing, even if intended for academic journals and even if wrestling with abstruse matters, should be wanting

John Henry Newman, a Victorian scholar who wrote huge amounts – including The Idea of a University, *perhaps the most influential text ever on the topic – talked of the 'bodily pain' that writing caused him. And I empathise with that phrase*

to say something. In other words, each piece of writing should contain and should expound a thesis. (Doctorate students typically come to understand that the term 'thesis' refers to a large and heavy text; they often fail to grasp that the more important meaning of the term is in referring to the heart of an argument that they should be expounding through the body of their text).

All too often, I suggest, pieces of academic writing lack a definite thesis. One explanation we have already touched upon, namely the press on academics simply to write; and their academic writing has to be fitted in with all the many pressures upon them, both in their academic lives and at home. Forging a thesis and arguing cogently for that is a step too far. A second explanation is that the identification of a thesis – becoming clear in one's own mind with razor-sharp clarity as to the thesis one wants to drive forward – is extremely hard work. A third is that it calls for thought, and many academics may feel that they simply do not have time to think, being so busy just getting through the day. (Heidegger's book, *What is Called Thinking?*, draws attention to the thoughtlessness now characteristic of modern life).

But there is a crucial fourth explanation at work. It is that that the forging of a thesis and carrying it through takes courage. And courage here works on more than one plane. One needs courage as an academic writer simply because once a work is published, it is there in the public domain. No action replay! One is then exposed in a stark way to the critical gaze of others. Secondly, one needs courage to sign oneself up to a definite position, to stake out one's particular territory, and perhaps over time – for good or for ill – to become known for *that*. And thirdly, in taking up a position of any substance, one will be inevitably going against the grain, to some extent, of existing authorities. This is especially a challenge in today's climate, in which there is such a strong set of expectations to publish and one is dependent on the gatekeepers (editors, anonymous reviewers and publishers) to think well of one's efforts.

It is hardly surprising, therefore, if one would rather do anything but write. John Henry Newman, a Victorian scholar who wrote huge amounts – including *The Idea of a University*, perhaps the

most influential text ever on the topic – talked of the 'bodily pain' that writing caused him. And I empathise with that phrase. The pain, or perhaps severe discomfort might be a better term, is a product – as we have seen – of both internal and external presences. There is the internal struggle, trying to make sense of the murmurings within one, bringing feelings, values, cognitions, evidence and imaginings into a coherent story. And there is the external struggle, in trying to write in such a way that one's efforts might satisfy demanding audiences of various kinds. The blinking cursor may be demanding words from one, but just how is one to find an orderly series of words that will meet such complex challenges?

Going about the task

It is apparent that the task in question presents itself on different levels. There is the task today, of a typical writing session; there is the piece of writing on which one is working; and there is the larger task of becoming and being a writer, albeit an academic writer. I shall deal with all three levels together, but it is worth keeping them in mind as distinctive challenges.

If one is going to become an academic writer in the way I have been talking about it – and not just an academic who writes – then one will be writing regularly. For myself, if a day passes without my having written something (or at least worked on an already existing draft), then I feel that the day has not been fully satisfactory. Typically, creative artists – composers, painters, fiction writers – will be in their studios or at their desks at a particular hour in the day and will work there for some hours. It was famously said of Kant, the great German philosopher, that the citizens of his home town could time their watches through Kant going for a walk in the afternoon after he had spent the morning writing. The point is that there has to be some regularity, however modest, to one's writing efforts.

Modesty and realism are the watchwords here. There is no point is saying internally 'I am going to write 500 words a day' only to fall by the wayside after two or three days, with the realisation that the goal has been too demanding. Much better to have a more modest goal that is realistic given
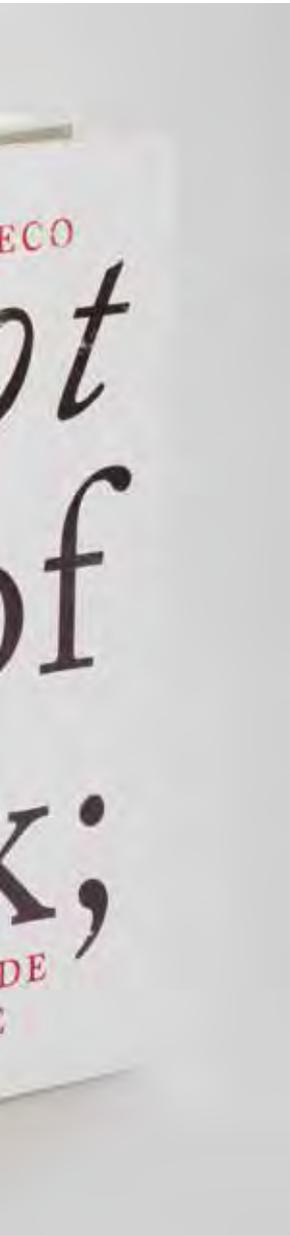
It was famously said of Kant, the great German philosopher, that the citizens of his home town could time their watches through Kant going for a walk in the afternoon after he had spent the morning writing

the many demands on one's life (both as an academic and more widely with one's personal life). Perhaps a week will be a better writing unit, with one's writing being accomplished largely on say Friday and the weekend. The trick is to find a way of structuring into one's life a realistic writing component. A short writing session more or less every day – or the equivalent over a week – will see one making rapid progress. Perhaps a goodly number of words to aim at might be, say, 1,500 across the course of a week. That's an average of less than a page a day or, say, around half-an-hour's writing each day. Continued over time, that is equivalent to a book a year!

It is evident, then, that very limited goals are the order of the day. For myself, I never sit in front of the computer and say to myself that I am going to write a paper, still less that I am going to write a book. To place such challenges on me would be far too onerous. Nothing would get written. What I say to myself is that, today, I am going to write about one and a half pages (and it might be a little more or less). When I have achieved that, the writing session is finished and I stop and turn to the other many items in my to-do list for the day.

There are two riders here. First, of course, this drip-drip approach to writing produces its own challenges. It all sounds as if writing is here just a matter of labour, of routine, but wasn't that what was to be avoided? Where is the room for inspiration? I repeat: this steady-steady approach to writing is precisely how creative artists go about their work. Their imaginative creations flow from steady and, indeed, painstaking work undertaken over time. More, their creativity arises precisely from such disciplined work accomplished on a regular basis. As the old saying goes, it is a matter of 98 % perspiration and 2 % inspiration. If one is working steadily, then one's mind will spontaneously be mulling over issues during the day (and night) and ideas will be coming to one. Therein lies the basis of genuine creativity as one wrestles authentically with one's own academic problems for and by oneself.

Secondly, how can one ensure that the thoughts in one's mind have a continuity to them, when the work is being interrupted in this way? How can one pick up the threads and recall what was in one's mind
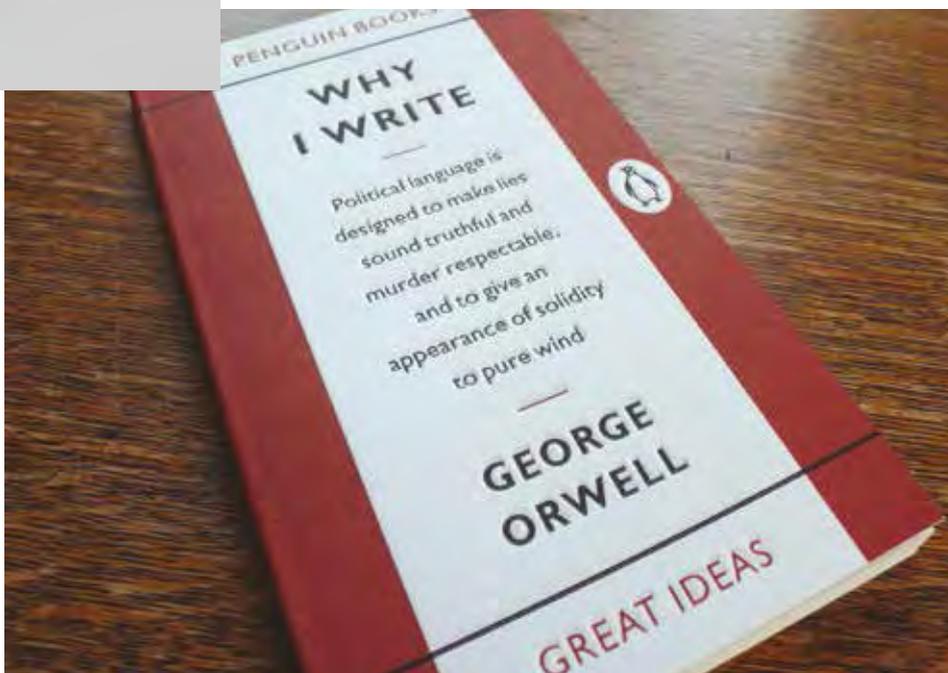
on an earlier day? I have found that if I let the sun set twice on a piece of writing on which I am working it is difficult to pick up the threads. Sometimes – as last night! – I leave myself with a question which I then have to answer as I start to write; and little techniques like that help to maintain a steady and directional flow of thought.

There is, though, a structure to one's writing efforts; we might even call it a set of disciplines. In a typical writing session, one is picking up from where one left off and trying to continue the line of thought or analysis. But that writing will have some boundary markers. There may have been a sub-heading, perhaps two or three pages back, and the words and the propositions one is forming should hang together within the frame supplied by the sub-heading. In turn, the sub-heading and its section of text has its place in the overall flow of the whole paper, all headed by a particular and carefully chosen title. And there will be, too, a sense as to how the paper will be going forward, towards its concluding section.

The architect, the artist and the craftsman

The academic writer, accordingly, is a kind of architect, designing a building. And the building has a general character – it is in economics, or in anthropology or in business studies – but much room is left for invention, even while attending to the disciplines involved. There may be some characteristic materials that one uses at any moment in time; fashions that come and go (certain terms, certain researchers to whom reference might be made, and certain ways of reasoning and expounding of an argument). There is also the architecture of the whole piece of text: do the parts fit and work together to form a coherent entity? As a reader, is one being led progressively from one room to another, with slightly different vistas opening through the windows? This metaphor of architecture is, therefore, highly potent for me as an academic writer.

It is important to aim to produce a first draft quite quickly; and then one has something to work on. There are so many considerations that one cannot hope to do them all justice straightaway in first draft. Just some features to attend to are the references and the bibliography, the reasoning, the sequencing of the argument, the depth and robustness of the data and its analysis, the ordering of the parts of the text, the length of the paragraphs and the sentences (which are characteristically far too long in academic writing), the integrity of each paragraph and each sentence, the overall development of the thesis, the balance of the sections and the effectiveness of the introduction and of the conclusion. Typically, I would say that one needs to work one's paper through five or six drafts to get it to a taut and polished state where it can be submitted to a journal. (My books go through many more readings and reworkings – but that effort moves forward. There is a definite end to the process.)

I have mentioned the metaphor of architecture, of seeing the forming of a text as that of designing a building. In giving expression to the crafting of an academic text, yet other metaphors come to me; for instance, seeing oneself as a kind of sculptor or impressionist painter or playwright.

The sculptor of very large objects, I take it, has to start by forming a rough shape out of a block and then works on that, and so the envisaged object starts to emerge before one. But there is a kind of conversation, such that the sculptor responds to the material and to the object and perhaps new ideas develop in this conversation. So too with academic writing, as one works on one's drafts, seeing new possibilities, and other structurings, arrangements of the parts and orientations. *The impressionist artist*, I presume, has an acute sense that very small inflections of paint can make a telling difference to a painting, *even if imperceptible*. There is, perhaps, always a temptation to do more, to add yet another speck of paint here rather than there. So too in academic writing, not least in using word-processors, search engines and computerised data analyses. But the artist has to be prepared to stop, to step aside. *And the playwright* has the challenge of determining who are the main characters, which parts they may have, when they are to appear, when they are to be brought forward and have speaking parts. So too in academic writing, as one determines which research and scholars one will attend to, and which themes, issues and concepts, and in which part of the story.

It follows that the expression 'writing up one's research' should be banned for writing is a creative and a crucial part of the research. In good academic writing, one works at one's ideas, trying to bring them forward so as to be pleasing, to have a harmonious inter-relationship between them, and to exhibit soundness and sureness of grasp of one's material.
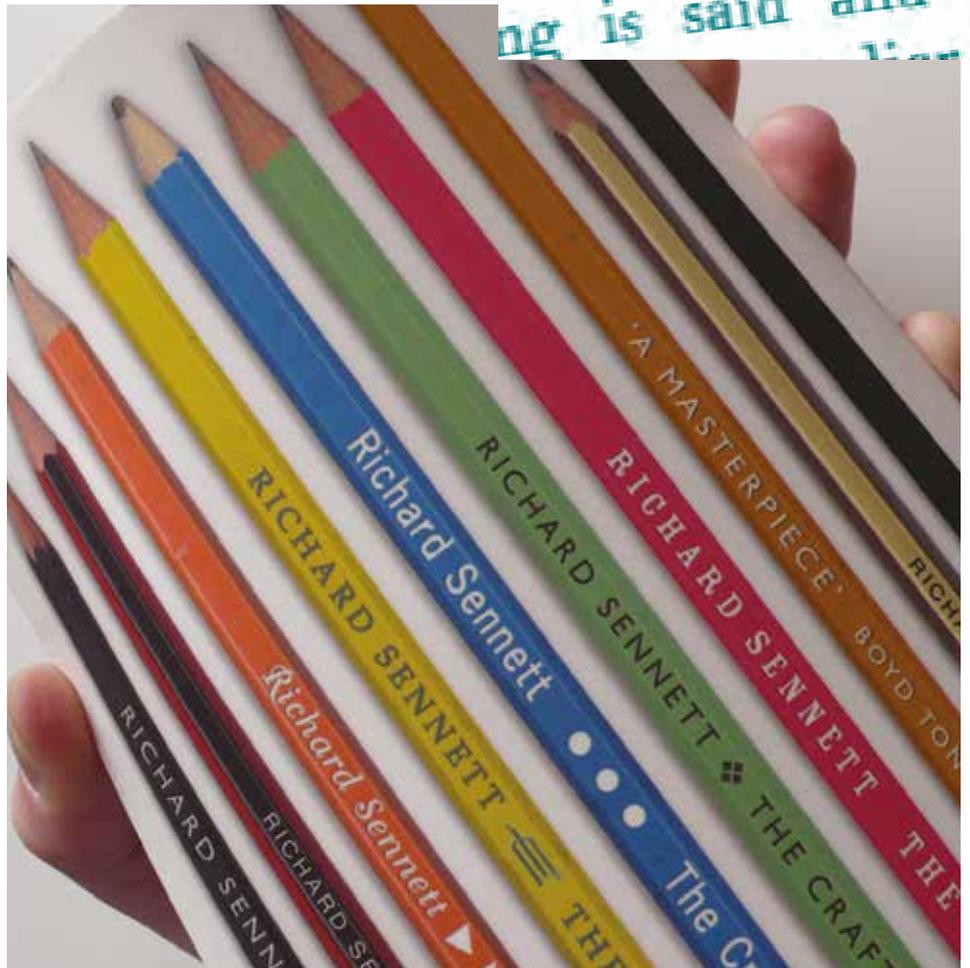
A word could always be more apt, a phrase more telling, a sentence tauter, a paragraph a happier rhythm and a text as a whole more transparent and lighter structure. There is artistry here

This is a concern without end. A word could always be more apt, a phrase more telling, a sentence tauter, a paragraph a happier rhythm and a text as a whole more transparent and lighter structure. There is artistry here.

In his book on *The Craftsman*, Richard Sennett talks of a craft becoming a kind of obsession (Sennett, 2008:245). This is not a bad word here. To be obsessed as a craftsperson is to care deeply about communicating to maximum effect in one's writing. Such care leads to a continuing concern to work at one's text, not merely on the detail for its own sake but so as to help the reader gain an acute understanding without too much difficulty of what is in one's mind as a writer. This is more readily stated than achieved.

So often I see two contiguous sentences, each of which is fine itself but where the link between them is unclear. Characteristically, this is due to the writer not spelling out all the steps in the argument; and not noticing the gap. Indeed, if pressed, she or he may well think – and even say – of course, 'the point is evident!' To them, the steps in the argument are clear in their mind, so clear that they fail to realise that they have not set down all those steps in the construction of the paragraph in question.

Here, yet another metaphor beckons: good writing is like putting in layers of bricks in the construction of a building. Each brick has its place and each brick is doing work; and one cannot put in a higher layer of bricks unless each layer underneath has been painstakingly put in. Otherwise, the necessary support won't be in place, to bear the weight of the argument or propositions. In writing, it is all too tempting to jump to those upper layers, where the argument begins to get interesting, but each brick – and each point in the argument – needs carefully first to be put in place. This can be laborious, spelling out each point, especially when it may feel that all the reasoning is apparent. But the (academic) writer cannot afford to leave the reader wondering as to how a proposition or how a particular step or even how a particular technical term has been reached. All has to be translucent.

Concluding thoughts

Increasingly, academic work is being required to show its impact upon the world. Amongst other things, this point of view places an injunction upon academic writing that it be as effective as possible. This means, in turn, that academics are, in effect, being required to concern themselves with the quality of their writing. But what this surely means in turn too is that academics need to think even more about their audiences and write in such ways as to reach out to their audiences. These considerations hold across all disciplines, especially those with obvious social, political, professional and policy implications.

Having a concern for one's writing, caring about the choice of words and the construction of sentences and paragraphs and advancing a definite and coherent thesis are therefore becoming matters of public importance. The word 'public' here is crucial. In taking writing seriously, academics collectively can have 'impact' in a rather obvious way (as measured by performance indicators) but, more importantly, can help to forge a public realm. Through good writing that reaches out to multiple publics, academics will become public intellectuals in a natural and organic way.

But more significantly still, through caring about writing, and working at it modestly and diligently, academics will come to change themselves. This is an extraordinary feature of writing, that ultimately its largest impact is on the writer her- or himself. One comes to see the world in new ways but, more, one comes even to see oneself in a new way. Good writing is a voyage into a new personal space. The writer ultimately transforms herself.

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MENTAL TOUGHNESS:
IS IT THE KEY TO ACADEMIC SUCCESS?

This paper explores the relationship between mental toughness and end-of-semester grades in university students

Why consider mental toughness as a learning attribute?

The transition from secondary education into higher education (HE) has been identified as a time of risk in young adults. The challenges facing undergraduates are extensive, such as, moving away from home, taking control of finances, forming friendship groups and establishing a support system (Nelson *et al.* 2013). Furthermore, the peak age of onset for a range of mental health disorders is below the age of 24 and this coincides with the age at which most students' transition into HE (Kessler *et al.* 2007). Masaskill (2013) reported that students in widening participation universities are particularly vulnerable to depression and anxiety and are at greater risk of dropping out of university. There are added concerns for young adults in this age group who have an increased risk of drug and alcohol abuse (Stamp *et al.* 2015). All of these factors have been associated with poor academic performance and higher attrition rates (Nelson *et al.* 2013). Numerous studies concentrate on risk factors, whereas the aim of the present study is to identify factors that are have an ameliorating impact (see also Stamp *et al.* 2015). This study focuses on ways of developing 'mental toughness' to address the disruptive experience of transitioning into higher education.

What is 'mental toughness'?

Mental toughness (MT) is a multidimensional psychological construct that conceptualises the way in which individuals respond to adversity and recover from setbacks. Students in sports-related studies who are high in MT, are reported to not only be more resilient in stressful situations, but flourish in them (Clough *et al.* 2002). Clough *et al.* (2002) define MT within a set of four sub-components. Crust *et al.* (2002) outline these components as follows:

1) Commitment which refers to the level of engagement with a task
2) Control (emotional and life) which describes the extent to which people feel that they exert an influence over situations
3) Challenge characterises a situation where adversity is seen as opportunity for self-development
4) Confidence (in abilities and interpersonal) is defined as the resolute belief in the ability to succeed.

> *Mental toughness (MT) is a multidimensional psychological construct that conceptualises the way in which individuals respond to adversity and recover from setbacks. Students in sports-related studies who are high in MT, are reported to not only be more resilient in stressful situations, but flourish in them*

Clearly, these constructs are characteristics that are fundamentally important in dealing with the challenges of higher education. One point to note is that much of the research leading to the development of these components has been conducted in the area of sports and students for studying sports-related degrees. Therefore, the recent concern is whether this can be applied to students on other degree courses.

Emotional control and mental toughness

Crust (2009) argues that MT is associated to high levels of emotional control, in particular, the avoidance of the consequences of negative emotions on performance. Research would seem to support this view, for example Clough *et al.*(2002) reported that irrespective of whether feedback was positive or negative, performance of those higher in MT remained stable. Conversely, the performance of individuals lower in MT was dependent upon whether they were given positive or negative feedback. Nevertheless, Crust (2009) found that there was no association between MT and intensity of emotions. This suggests that individuals higher in MT feel emotion as intensely as those lower in MT, but that

they are able to exert control over their emotions. It is possible that being able to exert control over the negative emotions (that can lead to depression and anxiety) is of key importance rather than the manifestation of positive emotions.

Cognition and mental toughness

Studies are emerging that have reported that MT is associated with cognitive functioning and ultimately achievement and progression. Dewhurst *et al.* (2009) reported that those high in MT were less distracted by irrelevant information during a memory task. This indicates that mental toughness helps individuals to remain focussed on current goals with less interference from unnecessary intrusion. Furthermore, Hardy *et al.* (2014) found that mental toughness was associated with complex task learning in particular on the MT sub-scale that related to self-belief. Their finding appears supported by the research of Crust *et al.* (2014) who reported that there was a positive correlation between MT, grades and ultimately progression in university students studying for a sport degree. That is, the higher the MT score the higher the grades, hence the student is more likely to remain in HE and progress.

It is important to note that research on mental toughness was initiated in the area of sport and has been advanced further in the area of occupational psychology. It is only more recently that studies have endeavoured to investigate the role that mental toughness may play in higher education

Gender differences in mental toughness

An area that has been given little attention is that of possible gender differences in mental toughness. One of the few studies to have systematically investigated these potential differences is that of Nicholls *et al.* (2009). However, it should be noted that this research was again conducted on athletes and individuals studying sports related degrees. The researchers reported that males were significantly higher in MT in comparison to females on total MT scores as well as on the subscales of 'control-of-life', 'control-of-emotion', 'confidence-in-abilities' and 'challenge'. Nicholls *et al.* suggest that this could be due to differences in the way males and females express mental toughness or reflect socialisation differences. This difference in scores therefore does not necessarily mean that females are less mentally tough than their male counterparts, but they may exhibit MT in different ways perhaps due to social expectations. It is also possible that both males and females give socially desirable answers and the differences in scores could reflect this. For example, females may be reticent to give answers that suggest aggression whereas the converse may be true of male. That is, males may feel pressured to give responses that suggest high levels of aggression. Thereby, perceived gender difference might reflect the giving of social acceptable answers. However, it does seem that this is an area that needs further consideration as the number of females entering HE has increased substantially and HESA figures for 2013/14 reveal that 56% of students entering University are females. If the scores to reflect a real difference in MT between males and females then this could have an impact on attrition and attainment.

The role of age and experience in mental toughness

Nicholls *et al.* (2009) also investigated the impact of age in their study and found that it was a significant predictor of MT scores. Given the age of a typical student entering HE this would seem to highlight a potential area of vulnerability. That is, the majority of students transitioning into higher education are 18-19 years old, who may have not yet reached a degree of mental toughness necessary for the rigours of higher education. Further to this, Nicholls *et al.* also reported that years of experience (as an athlete) was a significant predictor of mental toughness. As the authors point out, age and experience are likely to be highly correlated. However, it is possible to have a mature student who is new to higher education, thereby having age but lacking in recent education experience. This does seem to suggest that research should consider age and experience as factors that could have an impact on levels of mental toughness.

Research in higher education

It is important to note that research on mental toughness was initiated in the area of sport and has been advanced further in the area of occupational psychology. It is only more recently that studies have endeavoured to investigate the role that mental toughness may play in higher education. While studies such as Crust *et al.* (2014) offer some insight students in HE, this and other studies have been mainly conducted on students studying for sport-related degrees.

One of the aims of the present study is to investigate whether HE students who report higher mental toughness are more likely to be academically successful than those reporting lower mental toughness. A further aim is to gain further insight into the role of affect, that is, positive and negative emotions, in academic success. Given that there are also some indications that gender and age may have an influence, both factors were taken into consideration.

An opportunity sample of 161 undergraduate students, 120 females (age range 18-48) and 41 males (age range 18-28) took part in a survey. Participants were asked to fill out two questionnaires to assess mental toughness and affect (emotion). The first questionnaire was the "Mental toughness Questionnaire 48" (MTQ48) (Clough *et al.* 2002) a 48 item validated questionnaire with the subscales as described above. This has a 5 point Likert scale where participants rate a number of statements on a scale of 1 (strongly disagree) to 5 (strongly agree). The

second questionnaire was the "Positive and Negative Affect Scale" (PANAS) (Watson *et al.* 1988). Participants are asked to rate 10 positive mood descriptors and 10 negative mood descriptors as to how closely they reflect their mood state on a scale of 1 to 5, where 1 = slightly/not at all and 5 = extremely. With the students' permission their questionnaire data was compared to their mean end of year mark.

Findings of the present study

Analysis was conducted separately for males and females and age was accounted for within the analysis by using partial correlations that removed any confounding effects of age. However, given the low number of male participants these results for males should be treated with caution. Interestingly in females, there was a negative relationship between grades and 'control-of-emotion' and a negative relationship between 'confidence-in-abilities' and grades. Indicating that as control-of-emotion and confidence-in-abilities increased grades decrease. This could suggest that there is an element of over-confidence that perhaps leads female students to take less notice of the requirements of an assignment than they should. The negative relationship between control-of-emotion and grades may indicate a lack of emotional engagement in their studies. In males there was a positive relationship between grades and commitment. That is, the more committed male students are to their chosen course of study, the higher their grades.

As might be predicted by the research of Crust *et al.* (2009) there were no relationship between the PANAS and grade in females. While it is as predicted, this would seem to be at odds with the correlation between grade and control-of-emotion. That is, given that control-of-emotion is related to grades it might be expected that the PANAS that directly measures emotion does not show a similar relationship with grades. As such, this seems to be difficult to easily explain and perhaps requires further investigation. Surprisingly, for males there was a positive relationship on the positive PANAS scale and grade, that is the higher the positive emotion the higher the grade. This seems to indicate that having positive affect (emotion) is related to academic outcomes in males.

Females who believe that they are in control of the outcomes, engage in their studies to a greater extent than those with lower mental toughness. Given the perception of greater emotionality in females, the finding that control-of-emotion has little impact comes as something of a surprise

Taken together with the positive correlation between grades and commitment would suggest that feelings of commitment and positive affect are important factors in success in males.

Regression analysis was conducted to consider whether mental toughness as measured by the MTQ45 can be used to predict grades. This revealed that in males 'commitment' remained a positive predictor of grade. Likewise, in females' confidence-in-abilities was a negative predictor of grade. Again this suggests a degree of over-confidence in female students. Furthermore, control-of-life positively predicted grades whereas control-of-emotion did not. This could indicate that females who believe that they are in control of the outcomes, engage in their studies to a greater extent than those with lower mental toughness. Given the perception of greater emotionality in females, the finding that control-of-emotion has little impact comes as something of a surprise.

Further regression analysis conducted on all 161 participants rather than separately for males and females, revealed that control-of-life positively predicted grades, indicating that the higher the control of life the higher the grade. Conversely, confidence-in-abilities negatively predicted grade whereby as confidence-in-ability increase grades decrease. This seems to indicate that where students believe that their outcomes are under their control, as opposed to being subject to external control factors, their grades improve. It could suggest that there is a sense that taking responsibility and putting in effort will bring rewards. Conversely over-confidence could lead to an assumption by the student that they understand the requirements of assignments and as a result do not engage adequately with the assignments instructions.

Conclusion

The above are the preliminary findings and data is still being collated at this time. It is hoped that with more data some of the above findings will be clarified particularly the gender difference by an increase in male participants. To summarise the findings to date, confidence-in-ability and control-of-emotion were found to have a negative impact on performance. In HE we try to instil a sense of confidence in students, however this research suggest that students should be cautioned against being overly confident. Furthermore, high levels of control-of-emotion may be indicative of lack of emotional investment in studies which relates to a negative performance. This could suggest that lack of emotional investment is an important factor in academic success that needs further investigation. As an institution we should consider ways in which emotional investment in studying can be encouraged in our students. Arguably, one of the most important finding is the positive relationship between control-of-life and grades. It is perhaps unsurprising to those teaching in HE that students who see their attainment as being in their control have better outcomes than those who do not. The problems we face is engendering in students control-of-life, that is, a sense that their attainment is within their control and not externally driven.

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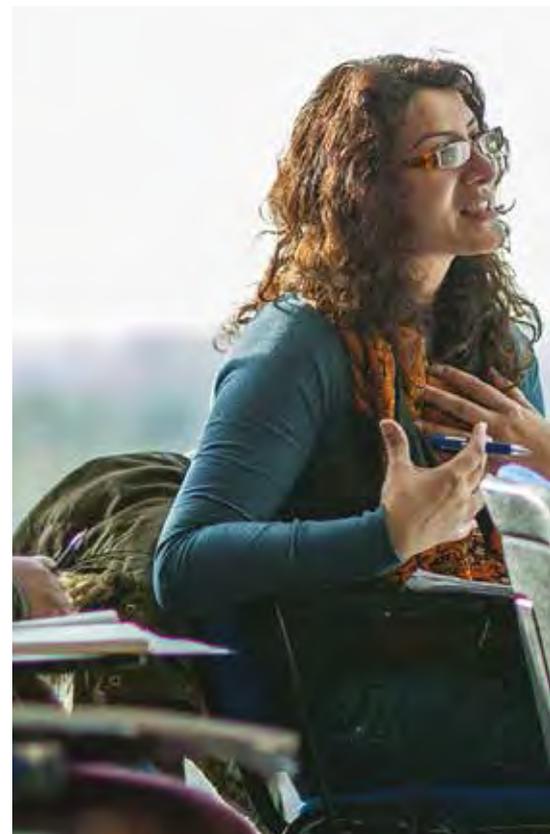
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OPEN SKIES

New air travel opportunities for Ceuta, a Spanish remoter region in Northern Africa, generated by air transport liberalisation in neighbouring Morocco. Spatial discontinuity and lack of seamless transport connections between Ceuta and the Spanish mainland pose significant accessibility challenges for the Spanish exclave

An integrated intermodal transport system, with seamless connections of different public transport modes, may positively affect an airport enhancement of its catchment area

Transport in remote regions of the world

Remoter regions around the world are usually denied sufficient surface transport services to metropolitan centres. This may be the result of a fragmented pattern in physical geography (e.g. islands separated from the mainland by sea), which renders surface transport impossible; and/or the outcome of socio-political geography friction (e.g. disputed areas close to the frontier of neighbouring countries) which makes investment in expensive surface transport infrastructure very unappealing. For these reasons, remoter regions and their local societies depend heavily on air transport to ensure accessibility and economic and cultural connectivity to the wider world. Local airports provide the necessary means for airlines to operate their services; in certain cases, however, such airports may be located in a neighbouring country thus raising the levels of complexity in the transport system. Studying, therefore, the range of an airport's catchment area becomes of great significance.

The role of the catchment area

An airport catchment area may be defined as the area around the airport from which the latter attracts its passengers. The size of this area depends on factors that determine airport choice from passengers such as ease of access and services offered by the airport in terms of fares, frequencies and infrastructure facilities compared with the other airports located in the vicinity. An integrated intermodal transport system, with seamless connections of different public transport modes, may positively affect an airport enhancement of its catchment area. This is because the development of, for example, a fast railway or a new highway make the access to an airport easier and reduce the time required to reach it (Versperman and Wald, 2011). With the continuous development of regional airports in Europe and elsewhere in the world, passengers now have a wider range of choices than ever before. This means that catchment areas of different airports overlap with each other in a constantly evolving competitive marketplace (Poulaki and Papatheodorou, 2013).

Interestingly, many regional airports owe their popularity to Low Cost Carriers (LCC) also known as Low Fare Airlines (LFA), i.e. carriers such as *Ryanair* and *EasyJet*. LCC market penetration in Europe emerged in the mid-1990s thanks to air transport liberalisation that took place over that period. LCC focus predominantly on offering a basic service at the lowest possible cost luring customers by low fares; in many cases they have managed to generate new traffic from new origin-destination pairings in addition to any diverted passenger flows from competing traditional airlines (Papatheodorou, 2002).

Airline routes to Morocco

Since a liberal, open skies agreement was signed between the European Union (EU) and Morocco in 2006, air transport services between the two signatories have literally boomed. In January 2015 LCC accounted for 42% of regular seat capacity in a market dominated by European leisure passengers to Morocco and Moroccans visiting their friends and relatives (VFR market) in Europe (Dobruszkes et al, 2016). Although *Royal Air Maroc*, the flag carrier of Morocco, still dominates the market, the two leading European LCCs, *Ryanair* and *EasyJet* are now ranked second and third respectively in terms of total seat capacity.

Ryanair offers 70% of *Royal Air Maroc* capacity as its main competitor from/to Europe having launched services from countries strongly related with Morocco such as France, Belgium and Spain. The following table shows that LCCs are as a major driver of network dynamics in the area having opened half of the new routes in the EU-Morocco market. This development has proved to the benefit of all major international airports in Morocco.

Ceuta

Ceuta is a Spanish autonomous city-region of about 82,000 citizens. In terms of physical geography it is located opposite Gibraltar in the northwest coast of Africa, bordering to the west and south with Morocco. Not surprisingly, Ceuta is facing serious problems of isolation as a result of not only physical but also political geography with potentially negative implications for the local society. Being a Spanish exclave in Northern Africa, Morocco has challenged the Spanish dominance in Ceuta as a relic of Spanish colonialism, and argues that Ceuta should be annexed by Morocco as a city in the region of Tangier. On the other hand, Spain considers Ceuta as Spanish territory upon conquest, long before the Treaty of Lisbon (1668), when Portugal accepted Ceuta as Spanish territory (Vernet, 2010).

This unresolved diplomatic issue between the two countries means that regular transport connections between Ceuta and the Spanish mainland have always been of strategic importance. Nonetheless, ferryboat services have not proved sufficient to cover Ceuta's transport needs. For this reason, a heliport was constructed in 2004 by Aeropuertos Espanoles y Navegacion Aerea (AENA), the Spanish Airport and Air Navigation Company, to serve Ceuta's citizens. It is the only heliport operating scheduled domestic flights into Spain and the only heliport in the world connecting two continents.

Ferryboats connect Ceuta's port with the port of Algeciras (Cadiz) in approximately 75 minutes, while helicopter flights operate between Ceuta's heliport, the airport of Malaga and the heliport of Algeciras (Cadiz). The company *Ceutahelicopters* was until recently the operator of those flights, while such operations are not under the EU Public Service Obligation (PSO) regime, thus are not eligible to receive blanket public subsidies. Nevertheless, there is a special pricing policy is implemented as Ceuta citizens pay a half fare upon production of ID, i.e. around 80 euros for the helicopter service, while all other passengers (i.e. non Ceuta Spanish citizens and foreigners) have to pay the normal fare of 160 euros.

Challenges for the Ceuta population

This transport regime has presented several challenges that have affected the normal operations on the routes Ceuta-Malaga / Ceuta-Algeciras. Legal, institutional and economic issues between the helicopter company, AENA and/or the Spanish government have led the first to suspend its operations periodically. For example, flights were suspended was from the early August 2013 until May 2014. The company announced its inability to continue operations due to insufficient demand and high operational costs. Scheduled helicopter flights resumed from May 2014 until July 2014 when the company suspended again its operations; since then, only emergency flights for health reasons have been operating from Ceuta heliport. Therefore and from 15,772 passengers in 2004 and a peak of 46,754 passengers in 2011, the heliport served only 1,089 passengers in 2015 (AENA, 2016).

This situation has proved very inconvenient for the citizens of Ceuta in terms of transport to the Spanish mainland, but also internationally. Even though helicopter fares themselves were not very expensive for Ceuta citizens, the latter had to incur an additional transport cost to reach their inal destination (e.g. Madrid, Barcelona or any other national or international destination). Consequently, the total Origin-Destination (OD) fare ended up being very expensive. Alternatively, and given the current suspension of helicopter services Ceuta citizens have to spend significant time for ferry connections to be transferred from the port of Algeciras to the airport of Jerez de la Frontera (XRY) in Cadiz region or the airport of Malaga (AGP); then fly to Madrid or Barcelona and then continue further to international destinations (if applicable). XRY serves only domestic destinations during winter season and a few international ones during summer period. AGP has an extended network but is farther away. Another travel alternative for Ceuta citizens involves Tangier airport (TNG). In this case one should cross the surface border with Morocco and drive for approximately 50 kilometres to reach the airport and travel to a number of international destinations. In summary, travel scenarios from Ceuta include the options shown in Table 2:

Airline Type	Routes Opened	Market Share (%)
LCCs	63	50.4
Traditional	23	18.4
Ex Charter	24	19.2
Hybrid Cases	15	12.0
Total	125	100.0

TABLE 1 Route evolution in the Morocco – EU market between 2005 and 2015

Source: Dobruszkes et al. (2016), adapted by the authors

Malaga (AGP)	Jerez (XRY)	Tangier (TNG)
Ferry To Algeciras port 1h15min	**Ferry** To Algeciras 1h15min	**Ferry** n/a
Helicopter 30min (currently suspended)	**Helicopter** To Algeciras heliport 15min (currently suspended)	**Helicopter** n/a
Car/bus 3h50min from Algeciras port, i.e. a total of 5h	**Car/bus** 1h17min from Algeciras port, i.e. a total of 2h30min	**Car/bus** 1h by crossing the border with Morocco

TABLE 2 Travel Scenarios from Ceuta to the three closest airports

Source: www.andalucia.com, www.distanciasentreciudades.com, www.rome2rio.com

Given the above, the best case scenario is to travel via TNG from/to Ceuta considering that it has the highest accessibility degree from Ceuta, compared to the two Spanish airports. Taking into account that the helicopter flights will remain suspended, AGP has the lowest accessibility degree from Ceuta since total time to access it is 5 hours and 5 minutes with a cost of 156 euros (Rome2rio, 2015). On the other hand, XRY has a medium accessibility degree from Ceuta since a passenger needs 75 min to reach Algeciras port with a ticket fare of 50 euro and then about 77 min (108 km) by car or bus to access Jerez airport and fly to the limited international destinations during summer or, domestically, in Madrid or Barcelona throughout the year. For all the above reasons, and in spite of the political issues between Spain and Morocco, further exploring the Tangier option is very valid from a local Ceuta society perspective.

Tangier Airport

As a result of the 2006 Open Skies Agreement between Morocco and the European Union, the air transport market of Morocco has experienced significant growth in terms of both network and frequencies served. This is also the case with TNG – from 268,829 passengers in 2002, the airport recorded 365,750 passengers in 2007 (first year after liberalisation) and 787,399 in 2015. So it experienced a rise of over 100% since the opening-up of the market (ONDA, 2016). This is undoubtedly good news for the Moroccan government, which aims to promote tourism in the country through traffic development based on low fares and new routes. In particular, the network served by TNG includes the following airlines and destinations:

– *Royal Air Maroc*: Casablanca, Paris (Orly), Brussels, Amsterdam, Gibraltar, Madrid, London (Heathrow), Barcelona
– *Iberia*: Madrid

Ceuta is facing serious problems of isolation as a result of not only physical but also political geography with potentially negative implications for the local society

– *Vueling*: Paris (Orly), Barcelona
– *Ryanair*: Madrid, Paris (Beauvais), Marseille, Brussels (Charleroi)
– *Jet Air Fly*: Rotterdam, Brussels, Charleroi
– *Air Arabia* Maroc: Brussels, Amsterdam, London (Gatwick), Barcelona, Madrid, Istanbul (Sabiha), Montpellier
– *Corendon*: Amsterdam
– *Germanwings*: Cologne
– *Air Portugalia* (TAP): Lisbon

Bearing the above in mind, the crucial question to ask is whether it would be beneficial for Ceuta citizens to fly via TNG to international destinations directly, or even to other Spanish cities and vice versa. In other words, should Ceuta be included into the TNG catchment area? This issue is very topical especially if *Ryanair* ends up realising its plan to launch an extremely low fare of 3 euros for Ceuta citizens to fly to/from Madrid with its flights from TNG, as well as a shuttle bus company to transfer passengers from/to Ceuta.

Primary data research was undertaken to examine the potential of TNG based on telephone interviews and email communication in Spanish and English with representatives from involved parties as follows:

• Destino Ceuta: official website of Ceuta tourism promotion body in social networks;
• AENA: the company that manages all Spanish airports
• Tourism Office of Ceuta City
• Ex manager of a major airline operating from TNG

Efforts were also made to approach ONDA, the state company that manages Moroccan airports, but eventually these proved futile.

The content of each interview was approximately the same with minor adjustments made each time to better fit the interviewee's professional context.

Main findings

Destino Ceuta confirmed that international tourists do arrive to Ceuta via Tangier airport; this is also occasionally used by citizens of Ceuta to travel to other Spanish cities. The Ceuta Tourism Office was also affirmative of the importance of TNG. Their representative confirmed that there is no problem in crossing the Moroccan border for Ceuta citizens who only have to show their passport to enter Morocco. All other travellers – foreigners or people from other Spanish places – need to go through formal immigration control which may prove inconvenient. Regarding the number of tourists to Ceuta travelling via TNG and crossing the borders the representative of the Ceuta Tourism Office repeatedly argued that no accurate related records exist. In his opinion, around 30,000 people cross the borders every month but it is impossible to classify them as leisure tourists and/or in any other groups. In any case, flights from TNG could prove to the benefit of Ceuta citizens for international destinations while for domestic ones (i.e. within Spain) ferry connections to mainland Spain and then transfers to Malaga or Jerez airports are adequate. Interestingly, though the representative of Ceuta Tourism office did argue that tourists visiting Ceuta from Madrid prefer to come to the city from Madrid Barajas Airport (MAD) via TNG.

Another interviewee used to work as a senior manager for a LCC operating from TNG to several European destinations. This particular LCC has managed to substantially expand its operations out of TNG since Morocco has signed an Open Skies agreement with the EU. According to this interviewee TTU (i.e. Tetouan Airport which is located south of Ceuta) is much closer to Ceuta than TNG (i.e. in a distance of 38km) but offers very few travel alternatives. In respect of the commercial strategy of the LCC that he used to work for, he argued that the population of 83,000 inhabitants of Ceuta hardly adds significant value to

any airport catchment area. Moreover, the particular LCC does not investigate or even know if and how many passengers that travel from its bases come from municipalities or cities in the geographical vicinity of airports. In any case, he did confirm that a more organised surface transport system from Ceuta to TNG could help expand the catchment area of TNG but he remained doubtful of the commercial justification behind such a project. Moreover, this particular interviewee had no knowledge of any inconvenience when crossing the border with Morocco.

When asked to propose measures that could enhance Ceuta's potential to be included in TNG's catchment area the interviewee commented that Ceuta's population is very small and its tourism incoming flows insignificant. He also thought that the helicopter flights to Algeciras and Malaga respectively were expensive before suspension. He compared passenger traffic of Ceuta which is on average 20000 per year with Melilla's (i.e. another Spanish exclave on the Northern Africa coast near the border between Morocco and Algeria) airport traffic which is 287000 per year adding that access to Ceuta is basically realised by ferry connection with ports in southern Spain and that anyone who wishes to travel from TNG airport would do that anyway. He completed his interview assuming that if the tourism authorities of Ceuta were interested in increasing inbound tourism in the city, they could approach the Moroccan Ministry of Tourism to talk with LCC about getting them to fly from TTU too. This could prove an opportunity for Ceuta, but considering the political situation between Spain and Morocco regarding Ceuta and Melilla, such a venture could prove more complicated.

A senior member of Ceuta heliport's management team accepted to participate in the research on behalf of AENA. Regarding the suspension of helicopter flights, he argued that this happened as a result of commercial reasons since both routes (i.e. Ceuta-Malaga and Ceuta-Algeciras) were characterised by low capacity and high operational costs. When asked whether TNG could be considered as a competitor to Ceuta heliport or Malaga airport, he argued that these airports are not in direct competition. Nonetheless, he admitted that a connection between Ceuta heliport (JCU) and TNG for business and leisure traffic could bring positive results and for this reason he stated that JCU should be considered as an international heliport. When asked about the use of TNG by Ceuta citizens to travel to MAD and/or to international destinations he claimed that for while there are certainly people from Ceuta that use TNG to fly with LCCs to MAD, he was not able to provide specific statistics on this. He just underlined that these are primarily leisure travellers as there is no significant business traffic from Ceuta to MAD via TNG with LCCs. He also added that although the distance between Ceuta and TNG is slightly more than an hour by car, crossing the borders is somewhat 'inconvenient'.

Conclusions

Bearing in mind these data, we may conclude that there seems to be a passenger flow from Ceuta to TNG regarding both domestic (i.e. within Spain) and international destinations. The fact that helicopter operations remain suspended and that travelling by ferry from Ceuta to Algeciras port and then by car or bus to Malaga or Jerez airports may prove inconvenient in terms of both time and monetary costs, seems to further support the TNG travel alternative. This mobility from Ceuta City to TNG airport may be also enhanced by initiatives that are related with direct surface connection between the two points and a more convenient border crossing. An additional motive may be given by LCCs offering low fares with direct flights from TNG to Spanish and European destinations.

Therefore, and even if the small size of the Ceuta market may render any discussions regarding its inclusion in the TNG airport catchment area of small commercial significance, it is evident that the physical geography (i.e. geographical proximity) may override political geography issues (i.e. the exclave concept) if people are forward-looking and open-minded. In fact, local societies are usually the ones suffering from political conflicts arising between metropolitan governing centres located far away from borderlands. Opening up the markets, creating trade interdependence and using tourism for peace may set the fundamentals for the removal of suspiciousness among nations and the true enhancement of accessibility and prosperity for remoter regions not only in the Mediterranean but all over the world.

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Keywords

Spatial discontinuity, airport catchment area, air travel alternative, air transport liberalisation

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A (DIGITAL) FINGER ON THE PULSE

Complex Event Processing (CEP) is a computer-based technique used to track, analyse and process data in real-time (as an event happens). It establishes correlations between streams of information and matches to defined behaviours

Defining the context

Healthcare is a growth area for event processing applications. By systematic review of existing literature and case studies within the health sector, this article is intended to provide a broad overview of the application of CEP and the data sources that contribute to it.

The rising popularity of the internet and the digital world has given rise to 'big data', a collection of large, complex data, specifically data resulting from the Internet of Things (IoT) such as sensors, cameras, social media, smart phones and other consumer and monitoring devices in use daily. Data scientists break big data into four dimensions: volume (data size), variety (data type), velocity (data speed) and veracity (data trustworthiness).

For healthcare, volume refers to the rapidly expanding size of the sets of data that is generated in every area of activity in a healthcare enterprise, from revenue to patient data, to supply and operations. Variety includes the diversity of data collected. In a hospital, for instance, data includes patient records containing a variety of information like lab reports, scans, x-rays, prescription details and other medical data. Apart from having access to patient data relating to diagnosis and treatment, other data such as patient scheduling and workflow, data resulting from healthcare administration and hospital hygiene are also available. Exposure to such rich and contrasting elements of data is challenging and requires the use of special techniques to synthesise and process these large sets of data in a reasonable time frame. With the advent of sensor technology, Radio Frequency Identification (RFID), personal health monitors, wireless network of wearable devices and other healthcare monitoring devices, there is significant velocity of incoming healthcare data. Finally, veracity relates to data assurance and quality issues which are of acute concern in healthcare as important decisions depend on having accurate information.

Data sets yielded from big data are so large that they cannot be processed and managed using traditional methods like Relational Data Base Management Systems (RDBMS). Such data warehouses are not able to handle the processing demands of big data that need to be updated

Big Data
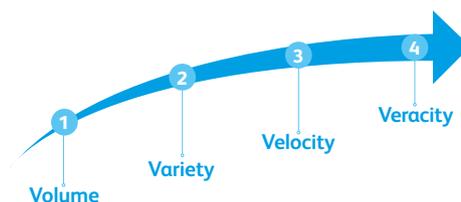
FIGURE 1 The 4 'V's of Big Data

frequently or even continuously (in real-time). So, instead of storing the data in databases for future use, CEP extracts real time data from the IoT devices as soon as it is generated and analysed by applying real time event analytics to find patterns and make better informed decisions about intervention and treatment options.

Research on CEP

This main focus of this article is to derive a holistic view of existing literatures related to the application of CEP techniques in healthcare. The aim is to establish the most common areas within the healthcare sector where the applications of CEP techniques have been widely implemented; and what main data source contributes to the processing of big data in healthcare. The summary below is based on a literature review of twenty-five articles published in English journals and conference papers between 2010 and 2014.

What are the most common areas within the healthcare sector where the application of CEP techniques has been widely implemented?

There are a wide variety of applications within the healthcare domain where the use of CEP is addressed. Some examples include remote monitoring of personal health and fitness to encourage healthier lifestyles; patient flow management system to monitor states in care processes; detection of hygiene care violation for preventing infections in hospital

The internet and the digital world has given rise to 'big data', a collection of large, complex data, specifically data resulting from the Internet of Things (IoT) such as sensors, cameras, social media, smart phones and other consumer and monitoring devices in use daily

setting; and tele-care/tele-medicine to reduce the amount of personal care devoted to early dementia sufferers by remotely monitoring their condition.

The most widely used examples where CEP is commonly used were for hygiene compliance (i.e. prevention of infection) and for remote healthcare.

Hospital acquired infections have been recognised as one of the major challenges in the healthcare system and serious attempts have been initiated by the World Health Organisation (WHO) to investigate and highlight the problem.

Hygiene compliance includes examples of applications for detecting potential threads of infection, monitoring of hygiene compliance of healthcare workers and the reporting of contaminated medical equipment. This was considered using the scenario of a healthcare hygiene control system equipped with sensors and hygiene control monitored and regulated throughout the hospital facilities by running pattern queries on continuous sensor data. In a real scenario running such a system, every healthcare worker wears an RFID badge and surgical and non-surgical equipment are tagged. Sensors are located in every patient's room, Intensive Care Units (ICUs), emergency rooms, operating theatres and near sanitising equipment. All these sensors continuously sense the environment and send collected events to a centralised system. Not only can the total number of events occurring in a second be very large, but the complexity of the patterns can also be very high, and urgent actions might be necessary in certain cases. Thus running pattern queries over such high input rate systems in real time is a challenge and needs an efficient underlying system to do so.

Remote healthcare includes examples on improving support for the elderly/disabled in their home and care for early dementia sufferers. Remote monitoring is an expanding application area, dealing with the possibility to remotely track relevant status of a person in real-time and to monitor his or her status over a longer period. This is a common approach in healthcare domain (remote patient monitoring) where some vital parameters of the patient is tracked and thereafter analysed for finding some types of anomalies. For example, the ECG (Electrocardiogram) signal of a patient can be analysed on different types of arrhythmia (an irregularity in a rhythmic action such as a heartbeat or breathing), allowing useful detection of cardio problems. Patients' use of wearable devices and remote patient monitoring devices has proven that they can capture valuable data for certain patients, including those with chronic diseases. Some hospitals also have reported positive results after remotely monitoring patients who were discharged from their facility. Remote patient monitoring technology allows clinicians to observe patients without seeing them in person and quickly react to any worrisome changes in their health.

What has been the main data source types contributing to the processing of big data in healthcare?

Big data in healthcare offers a wide variety of data types. Use cases that were explored indicated a range of data sources related to patient healthcare and well-being; clinical decision support systems (medical imaging, laboratory and pharmaceutical data and other administrative data); sensor data from medical devices that monitor vital signs; social media; web pages; GPS (Global Positioning System); and RTLS (Real Time Location System) data resulting from tracking devices/patients/staff at precise locations.

For example, for the patient flow monitoring system to reduce waiting times in hospitals, RTLS tags are assigned to patients and key care providers. These tags use Wi-Fi and infra-red signals to reach location accuracy of about 10cm. This location data, along with data from existing hospital systems is triangulated using CEP to infer the current patient state and wait time (Badreddin and Payton, 2013). However, the most popular types of data sources discussed in the papers contributing to the processing of big data in healthcare was the use of sensor technology, which included personal and environmental sensors, RFID and wearable sensors. The hygiene compliance and remote healthcare monitoring examples considered earlier are typical examples of the popularity of such data sources.

Why does it matter?

Findings from this literature search indicate that CEP is effective and efficient in mining and correlating streams of data for detecting trends and anomalies in non-clinical applications but has limited capability of reacting in real-time to opportunities and risks detected that are related to clinical applications which require on-demand diagnosing and treating of patients. Popular use cases around 'remote healthcare' indicate a growing interest in studying and designing health technologies to meet the mounting healthcare needs of the ageing population, and the management of chronic diseases and personal health. Technologies are thus designed to help shift the burden of care from the clinical setting to home or other non-clinical settings. Monitoring data from patients wherever they are can be a direct benefit to healthcare such as reduced hospital re-admissions, shortened hospital stays and improved health outcomes.
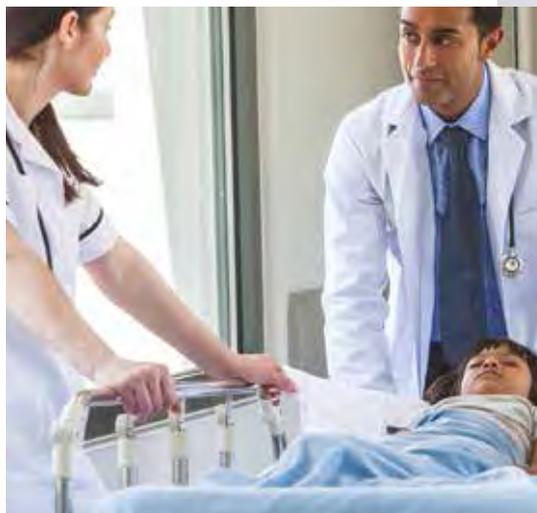
Key terms and definitions

TERMS	DEFINITIONS
CEP	Complex Event Processing
EMA	Emergency Medical Assistance
EMR	Electronic Medical Records
GPS	Global Positioning System
IOT	Internet of Things
RDMS	Relational Database Management System
RFID	Radio Frequency Identification
RTLS	Real Time Location system

Issues with CEP technologies

There is a need to overcome a number currently highlighted deficiencies in the sector; including rushed practitioners not following established practice guidelines; lack of care co-ordination; lack of active follow-up to ensure the best outcomes; and patients inadequately trained to manage their illnesses. For example, the management of care for diseases such as depression, obesity, asthma, diabetes and heart diseases requires a health care system that is essentially pro-active and focused on keeping a person as healthy as possible rather than reactive and responding only when a person is sick (Wagner, 2010). It is evident from this research that sensor technologies have given rise to a rapid growth in healthcare data and this can make a significant impact to healthcare delivery. It should be noted that it also introduces a data overload problem, for both systems and stakeholders that need to utilise this data.

Some of the ways to reduce data overload and optimise data usage in analytical work is to ensure that the various data input methods are standardised across healthcare institutions to allow for better integration and extraction of real value from the deluge of data that is produced every day. The use of decision support systems that integrate and filter meaningful patient data and present it to the clinician as required will also aid in alleviating some of the issues. Thus, the integration of real-time physiological data with patient history, electronic medical records and other administrative health data such as lab data will require careful implementation of a number of initiatives to make patient care more data-driven.

This confirms the need to apply efficient and effective event processing techniques to transform the large volumes of data into meaningful intelligence. From some of the case studies reviewed, it is clear that big data analytics can assist hospitals in efficient resource management by reducing emergency waiting times, tracking patient movements and preventing hospital-acquired infections. Operational data sources together with big data sources create an on-demand analytical view across key areas in the health sector which give powerful insights into patients' medical details, treatments, clinical processes, and services. Thus, the fusion of diverse data sources – both big data and traditional data sources – will provide in future a full holistic view to most aspects of healthcare related data.

Conclusion

Although CEP and the IoT together have extreme potential in solving existing and future problems within the healthcare industry, challenges regarding privacy, security, determining standards and the need to continually improve tools and technologies will need to be carefully addressed. Application of these technologies is still in infancy in the healthcare domain. With renewed focus on better healthcare, growth in population and increasing costs, healthcare industry has to embrace such technologies for effective and efficient functioning (Naqishbandi, Sheriff and Qazi, 2015). This will provide decision-makers (i.e. patients, carers, clinicians and administrators) with access to the data they need at the time they are making decisions. Therefore, the use of data analytics layered over other data sources will help to transform the data mountain into actionable information for better healthcare.

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With renewed focus on better healthcare, growth in population and increasing costs, healthcare industry has to embrace such technologies for effective and efficient functioning

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WHAT'S IN A SNACK?

Food and Chance: New ways to make modern food less predictable

For much of human history eating and drinking was a chancy affair, and not only in terms of availability, such as the risk of famine that continues to afflict parts of the world. Rather, the food we had could be inherently dangerous, a potential source of disease. The sense of food currently enjoyed in the Western world – secure, knowable, regulated, consistent, safe – is relatively recent, though some of our earliest culinary processes were as much about ensuring safety as imparting pleasure. Beer and tea, for example, took the chance out of drinking water by killing micro-organisms that would not survive brewing or boiling.

Safety

Industrialization and legislation have done a great deal to shape the landscape of contemporary food. The mass production (Levenstein, 2003) of branded items like Heinz beans, Big Macs and Mars bars ensures a sameness of consumer experience; what Allison James characterises as the 'homogenizing of food across the globe' (James, 2005: 378). Improvements in refrigeration, post-harvest technology, and advances in packaging and transport prolong freshness, while national government agencies, such as the U.S. Food and Drug Administration and Britain's Food Standards Agency, work to ensure the safety of what we ingest. Furthermore, there is evidently a consensus that it is insufficient for 'experts' to know about what's in our food, that consumers must be told too. So packaging information breaks down the constituent elements of a product, its place in a balanced diet, and, to an ever-growing extent, details other aspects of its provenance in laboured detail. A welter of small print, symbols and guidance – what Barrientos and Dolan call a 'barrage of slogans, labels and schemes' (2006: 2) now adorns much of what we eat, providing a multi-faceted 'assurance'.

Our horror when these systems and associated expectations are subverted – e.g. the 2013 horsemeat scandal in which equine and other prohibited flesh was covertly included in processed meat products – reveals the extent of modern expectations of total transparency. Never,

essentially, a human health issue, the scandal of meat adulteration really centred on the breakdown of trust in the food supply chain as less costly (and, crucially, undeclared) ingredients supplanted others. That the cheap meat pie is ideal for such subterfuge would not have surprised our forebears. A melange of chopped meat, concealed beneath pastry, it automatically fosters anonymity of content and provokes questions which, if followed to their natural conclusion, are increasingly worrisome. From the relatively benign 'What cut of the animal is this from?', through 'Which animal is this from?', to the grisly motif that recurs across texts as diverse as *Titus Andronicus* and *Sweeney Todd*, 'Who is this from?', some products lend themselves readily to being compromised. Hence the well-known joke of the butcher who will not eat other butchers' sausages because he does not know what's in them, nor will he eat his own, because he does.

Taking a chance

Yet we sometimes seek a return to chance, to un-tried culinary experience, even to danger, in our food choices. Travel, and the associated contact with unfamiliar foodstuffs, can bring about experience of unknown tastes. 'What is that?', 'What will it taste like?', 'What am I eating?', and 'Will I be alright?' are questions many of us will have asked – if only inwardly – on overseas trips. Though, sadly, the hegemony of global English and the tendency of the most *recherché* international foods to be 'discovered' by peripatetic supermarket buyers and presented on Western shelves make it increasingly unlikely to encounter novel foodstuffs. Relatedly, dining-in-the-dark restaurants, especially combined with a surprise menu, allow patrons to reverse not merely the norms of restaurant-going, like seeing your plate or the person opposite, but reintroduce a wider degree of doubt into gustatory experience, reminding us how little we can tell from taste alone.

Doritos 'Roulette' (as in Russian roulette) has a few very fiery chips in each bag, allowing consumers a degree of risk – albeit closely-managed risk – in eating a product where, deliberately, no visual cue exists to allow differentiation between the few hot

We sometimes seek a return to chance, to un-tried culinary experience, even to danger, in our food choices. Travel, and the associated contact with unfamiliar foodstuffs, can bring about experience of unknown taste

and the many innocuous chips. Spanish consumers would recognize this as experientially parallel to their 'Pimientos del Padrón', (scientific name, *Capiscum Annuum*) often served as tapas. A variety of small, usually mild, green pepper, the occasional one – the Padrón or Godfather – is decidedly hotter. A plate of Pimientos del Padrón will typically have a couple of hot ones, the effects of which are pleasantly mitigated by cold beer. It is a depressing indictment of our national diet that what exists in Spain as part of the recommended five a day (or is that now seven, as suggested by *The Independent* http://www.independent.co.uk/news/science/forget-five-a-day-new-research-suggests-that-you-need-seven-portions-of-fresh-fruit-and-veg-per-day-to-live-longer-9226653.html?) portions of vegetables and fruit, finds its closest parallel in a snack aisle product. With Britain consuming more than half of the crisps and savoury snacks sold in Europe (Blythman, 2006: xvi) this is hardly a product category that is not already, in every sense, saturated.

Considered alongside the many highly-spiced foods available to Western consumers, the degree of fieriness of the hot chips lurking in a bag of Doritos 'Roulette' is unremarkable. Countless brands of chili sauces and other products offer us taste experiences heralded as 'insane' or, more ubiquitously, 'max', 'maxed' or 'to the max'. This motif is as well-worn as the recurring trope of the

car advertisement in which the vehicle, invariably a conveyance of the most quotidian type, is yoked to ideas and images of adventure sports, risky thrill-seeking in frontier landscapes, and the rejection of humdrum office routine. Relatedly, a staple of the (UK) Indian restaurant menu is the well-known ascending scale of heat that rises from the mild Korma to the blow-your-head-off Phall; the latter concocted specifically by British Asian restaurateurs to satisfy the macho thrill-seeker. Yet, clearly, what heat alone fails to deliver is the element of unknowing that has otherwise been so diminished in contemporary foodways.

In a culinary culture where the direction of travel has been towards standardization, traceability and security it is intriguing to observe a product that runs counter-wise, that offers – in howsoever *ersatz* a fashion – variability, chance, and risk. To doubt and occasionally be surprised by our food can, it appears, be reinvented.

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USING FEED-FORWARD STRATEGIES IN HIGHER EDUCATION

The terrifying novel assignment: Using feed-forward to improve students' ability and confidence on assignments that test new skills

Within higher education it is strongly agreed that feedback is the most important way of raising student achievement and encouraging student learning (Gibbs and Simpson, 2005). Feedback is regarded as inseparable from the learning process, and is integral to several theories of learning (e.g. Kolb, 1984). With regards to academic performance, feedback helps students understand their performance, as well as how to perform to a higher standard on future assignments. In addition, feedback provides students with the confidence and the belief they have control over their success in higher education, as well as ongoing motivation throughout their degree.

However, over the past 15 years, numerous problems with feedback have been identified. Indeed, students report sector-wide dissatisfaction with feedback (Bloxham, 2014) and statistics from many universities show students do not check their written assignment feedback when they receive their marks (Gibbs and Simpson, 2005). When they do engage, they often report that feedback is not useful to them, that they struggle to apply the comments and suggestions given to future assignments, and that feedback looks back at work that has been done, rather than *forward* to how they can improve (Duncan, 2007). This is supported by Evans (2013) in her review of assignment feedback in higher education that states student dissatisfaction with feedback is well reported, and most complaints focus on the technicalities of feedback, including timing, content, organisation of assignment activities and lack of clarity about requirements.

It is therefore suggested there is a 'feedback gap' (Evans, 2013; Sadler, 2010), representing a disassociation between the efforts and guidance of lecturers and utilisation by students. In other words, a fundamental mismatch is occurring between how feedback is currently administered and utilised, and how feedback should impact on the learning experience. At present, most students view feedback in a linear fashion (Murtagh and Baker, 2009), where students complete an assignment, and receive feedback, but are not engaged with markers' comments. This linear model of feedback (Figure 1) demonstrates an absence of reflection and application of feedback comments. This directly

Feedback provides students with the confidence and the belief they have control over their success in higher education, as well as ongoing motivation throughout their degree

contradicts theories of learning that suggest feedback is a fundamental part of the learning process and should be fed into a *circular* as opposed to *linear* model (Beaumont, O'Doherty, and Shannon, 2011; Kolb, 1984). Central to this misinterpretation is the belief that tutors are delivering feedback at a time when students cannot use this effectively (i.e. in a formative manner). Addressing issues of timing, as well as the associated dissatisfaction felt by students, is clearly a vital endeavour.

Improving timing: Using feed-forward strategies

One way of improving students' performance on assignments, as well as their engagement and satisfaction with feedback, is to increase the use of 'feed-forward' strategies. Whilst there is no set definition for 'feed-forward', Sadler (2010) broadly suggests that this specific approach is 'future oriented'. In other words, feed-forward specifically

refers to feedback given by tutors that should either a) be given post-assignment with more specific direction on how this can be applied to future assignments or b) impact upon an upcoming assignment. In the most obvious sense many traditional theories of learning include elements of 'feed-forward'. For example, Kolb's learning cycle (Kolb, 1984) is fundamentally based on the notion of using feedback given to reflect on actions undertaken and to make improvements to future actions. Indeed, it can be assumed that many tutors', and some students' understanding of the process of feedback in higher education is loosely based on the idea that feedback should lead to improvement on future tasks.

With regards to the impact feeding-forward strategies have between assignments (i.e. feedback is taken from one assignment to another), Murtagh and Baker (2009) propose a fully integrated model (Figure 2, overleaf) that adapts the linear approach outlined above. They propose, instead of the learning process

effectively ending upon receipt of feedback, a much greater emphasis is placed upon ensuring that the student is clear about the next steps to be taken. Key to this process is 'feedback discourse' (Murtagh and Baker, 2009: 23) where tutor and students can engage in meaningful dialogue about feedback and what this means for them progressing to the next assignment (whether this is in a different format or not). This model can also be applied to engagement with feedback within assignments (i.e. where feedback is given before an assignment is due so that it can be applied to that same assignment), where tutors provide timely advice and guidance. Feed-forward strategies within assignments most commonly take the form of formative assignments and feedback, such as practice attempts at sections of an assignment, or a series of tasks related to the final submission. In this sense, students are assessed informally, or given feedback which can inform their final assignment piece. Wimhurst and Manning (2013) detail this process more specifically, describing a two-stage process. Firstly, students engage in an initial attempt at an assignment item. They then receive feedback and use their increased understanding of criteria and relevant standards to tackle subsequent summative assignments that carry more weight.

Put simply, 'feed-forward' refers to timely and constructive feedback that feeds into the next assignment point (Sadler, 2010). This is summarised in Figure 3, and represents the circular element of feedback, both at assignment level (e.g. in-task guidance such as drafts and practice) and at the broader level of learning and progression - e.g. reviewing feedback and generating action points (Beaumont, O'Doherty, and Shannon, 2011). Feed-forward strategies directly address the points raised in the previous section regarding the timing of feedback by tutors, and the utilisation of feedback by students. Therefore, if students are given a clear opportunity to act upon the feedback given, particularly when this is provided formatively for an upcoming assignment point, it can be assumed that tutors have the opportunity to improve student performance and satisfaction. This strategy is particularly important for novel assignments, or ones that test new skills.
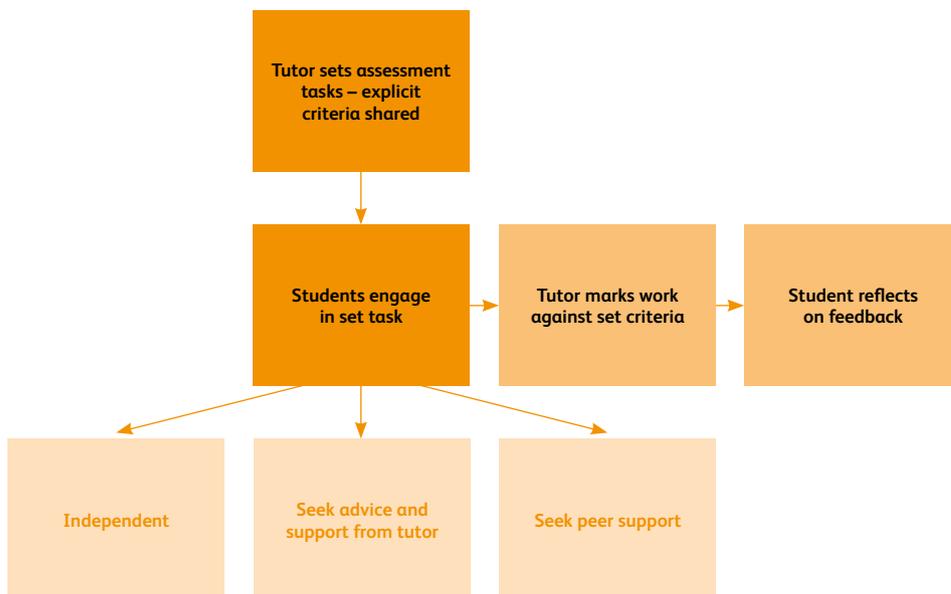
**FIGURE 1** A linear approach to feedback – Murtagh and Baker (2009)
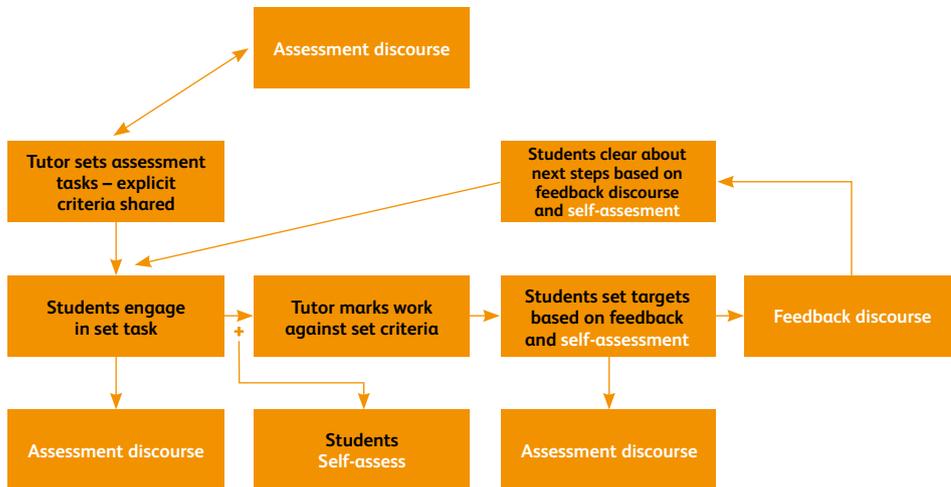
FIGURE 2 Connecting with feedback – Murtagh and Baker (2009)

Feed-forward strategies are clearly gathering firm support for their efficacy in improving student performance and engagement with feedback

Does feeding-forward work?

Studies that have specifically investigated the efficacy of feed-forward strategies have found encouraging results. For example, feed-forward techniques that involve students marking other students' exemplars led to improvements in student achievement – across ability levels – and in students' conceptions of coherence and integration in their final assignment submission (Wimhurst and Manning, 2013). Furthermore, strategies that involve the creation of high-impact feedback that is specific and clear in nature in its relation to future assignments are also linked to improvements in student performance (Vardi, 2013). Duncan (2007) demonstrated that by synthesising feedback given to students into individual learning plans that specifically target and highlight individual performance issues and how these can be improved for future assignments, small performance gains were made. Finally, Murtagh and Baker (2009) importantly demonstrated that by engaging students in both assignment and feedback discourse, and by specifically encouraging students to engage in self-reflection, they were successful in increasing their engagement with assignments, feedback, and deeper self-directed learning. This was primarily achieved by following advice set out by Sadler(2010), regarding formative assignments supporting student achievement through effective engagement with the task and outcomes required.

Feed-forward strategies are clearly gathering firm support for their efficacy in improving student performance and engagement with feedback. However, whilst it is evidently important to utilise feed-forward strategies in order to bring about improvements in achievement, few studies have investigated how feed-forward strategies impact on the student experience, and how students feel about their assignments and the feedback process. As highlighted above, many sources of student dissatisfaction with feedback revolve around the timing of feedback. It is therefore important to investigate whether, by providing students with timely, formative feedback, we can also improve students' feelings about the feedback process and satisfaction therewith.

The present study

The current study explored how applying a feed-forward strategy increased students' confidence in approaching a novel assignment in their final year of study, as well as their overall satisfaction with the assignment and feedback process. Students may experience a lack of confidence in their approach to these assignments due to an absence of previous experience. Furthermore, when 'traditional' (i.e. post-assignment submission) feedback methods are employed in these assignments, it is the authors' experience that students often report dissatisfaction as they feel they have only received helpful advice after submission, when it is too late to be acted upon. This can be resolved by allowing students the opportunity to practice and test these skills before the assignment due date, and encouraging them to feed-forward this experience into their work. It was hypothesised that giving students formative feedback to feed-forward into their assignment would lead to students reporting greater confidence in approaching a novel type of assignment and subsequently, greater satisfaction with the support given and their overall student experience.

Method

The assignment on the chosen module involved identifying gender-related content within media pieces (films, cartoons, news articles etc.), and relating these to theory of gender and gender development. This is a novel skill for most students on a psychology degree programme. In the fifth seminar of the module, students watched the first 60 minutes of the Disney film *Beauty and the Beast*. During this time students were encouraged to think about the gendered messages that the film might be presenting to them, and how this may be interpreted by viewers. They were then given the link to an online questionnaire, and told to fill this out in their own time. The importance of completing the questionnaire and its relevance to the assignment was stressed, and students were told that the length of time it would take would vary depending on the detail they included. This survey was designed to allow them to practice the skills required for their assignment before the submission date.
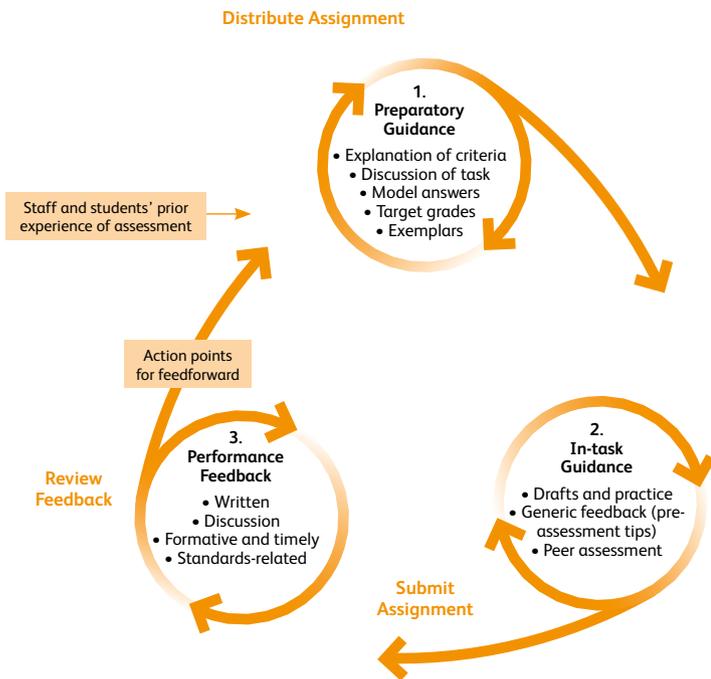
FIGURE 3 Dialogic feedback cycle – Beaumont, O'Doherty, and Shannon (2011)

Theme	Subtheme	Quotes
Issues with Feedback	**Timing**	*When we get the feedback, we read the feedback, and then kind of don't really do anything with it because we don't really have anywhere to take it* **(59-61, P3)**
	Nature	*Feedback is not consistent throughout the course. One lecturer will give massive amounts of feedback, another lecturer will give hardly any* **(118-121, P5)** *I find that sometimes when I get a mark, like I'll get a 70 or something, and then in the feedback there's loads of negative comments and you could have done this and I sit there and I'm like 'it doesn't really match the grade'* **(122-125, P5)**
Positives of Feed-forward	**Application**	*It's so much better to give feedback midway because you can actually apply it* **(50, P2)** *To get some feedback before the assessment and to be able to bring it into the assessment is really good because then obviously you know that you are at least slightly on track!* **(43-45, P1)**
	Knowledge	*It kind of gave us the groundwork of the points we should be putting in* **(71-72, P1)** *I got feedback and I went home and read it and it was stuff that I could genuinely change* **(192-193, P2)**
Impact of Feed-forward	**Grades**	*I definitely think that, if I hadn't have done the intervention, then I wouldn't have done as well as I did* **(270-272, P2)**
	Ability and Understanding	*It helped you understand what you needed to do rather than being told "you're gonna do this"* **(252-253, P4)**
	Confidence	*For me, it made me realise that I knew what I was doing* **(24-25, P3)** *It gave me more confidence and it kind of gave me a way to begin* **(273, P5)**

TABLE 1 Themes derived from the focus group

A total of 35 students out of 42 (83%) completed the questionnaire – presented using the online survey software Qualtrics. Students were first presented with a brief description of the questionnaire to follow and its intended purpose. In the questionnaire they were presented with a vignette from *Beauty and the Beast* with a brief description of what is happening at that point in the film. A free text entry box was provided so that students could give their thoughts on the messages they believed to be in the scene, and to begin to make notes on how they might relate this to theory. Once students had finished, they clicked to the next page and were presented with a number of options and thoughts about the scene provided by the module leader. This was to enable students to compare their own thoughts with that of an 'expert'. This would hopefully provide them with the opportunity to both confirm points they had made themselves as correct, but also to see what they had missed. Having the opportunity to practice this skill, and then compare to an expert allowed students to bridge the gap between their current knowledge, understanding and skills, and the required level for the assignment.

Results

A focus group was conducted with five of the students who completed the intervention. Focus groups were chosen because they allow participants, in interaction with each other, to speak for themselves, based on their own experiences, and in their own language. The moderator (first author) ensured that discussions remained open, free flowing, and honest, providing prompts to stimulate further discussion of a topic but not dictating the nature or direction of conversation. Three themes emerged from this analysis shown in Table 1: (1) issues with feedback; (2) positives of feed-forward; (3) impact of feed-forward.

Analysis showed that students felt more confident about approaching the assignment, believed that they had greater ability and knowledge to do so, and were more satisfied with the feedback process overall

Issues with feedback

Students were quick to identify problems with feedback, principally in direct contrast to the different methods used in this study. Many students disliked the lack of clear direction regarding how to take feedback forward, and felt that it did not have any impact on their work when received after their work was submitted, as for example Respondent 1:

Yeah like you're never going to come into 3rd year and think 'Oh, I'll just look at 2nd year's feedback'. Like I have never looked back on Turnitin at my 2nd year assignments and thought 'oh, this is what I did (395-397, P1)

Some students also felt the feedback did not help them if it was not consistent or did not match their, and the lecturer's, expectations:

I get the same problem but the other way round, like I'll read my feedback, and I've ticked off basically all the criteria for a high grade, and I look at the grade and I've got a 2:2. And I think well why did I get all the criteria for a first and manage to get a 2:2 grade (126-128, P4)

Positives of feed-forward

In direct contrast, some students were keen to point out the positives of feed-forward and how these rectify many of the existing problems with feedback. Specifically, students drew attention to the fact that feed-forward strategies allowed them to apply knowledge in advance of assignments and therefore have a better chance at producing work in line with the lecturer's expectations:

It's like a stepping stone to the next bit so you, you had a little go at it, you got told what was right and what was wrong and then you could take it and apply it to what you had to do that was going to get you marks. Something that was actually gonna be worthwhile (64-66, P2)

In addition, students said that the intervention equipped them with knowledge regarding the nature of the assignment. They were also given a better impression of what was needed in terms of the assignment requirements:

Impact of feed-forward

Lastly, participants talked a lot about the impact that the intervention had on their achievement in three different areas. Firstly, participants felt that the intervention had enabled them to get a better mark than they would have achieved under traditional teaching methods:

I just wish we had more of this on other modules, because there are some modules were I have done really bad and if I had done something like this I probably would have got a much better mark (310-311, P3)

Participants also spoke about how receiving feedback before the assignment was due improved their understanding and ability to achieve the task. This is particularly important considering this was a novel task involving a new skill set, and students may not have had practice at this skill before:

I just think it kind of gave it more of an application, like you see all the lectures and you know what you wanted us to write but at the same time it was kind of like the middle between just sitting there and listening to a lecture, and watching a lecture and then having to write it…It kind of forced you to make a little plan for yourself (300-305, P1)

Finally, almost all participants in the focus groups mentioned increased confidence following the intervention. This is particularly important in reference to the student experience, as (in the authors' experience) often students are happy with their grades (whatever the grade) if they feel that they have been enabled to try their best and they have understood the task, as is the case with Respondent 5:

I'm glad that we got to do it because it made me feel more confident on the actual essay rather than being worried about something I had never done before. It made me feel confident and I am actually really confident with the grade I got because I knew what I was doing (277-279, P5)

Discussion

This study investigated whether allowing students the opportunity to practice a novel skill ahead of submitting an assignment that tested that skill improved their satisfaction and confidence. In this sense, an opportunity was given for students to engage in feed-forward practices (Sadler, 2010) and to adhere to a more productive, circular feedback pattern. Broadly, whilst bearing in mind the very small sample and the very specific context of the task they were given, results showed that students responded positively to this technique of feedback, and highlighted the positive attributes of such an approach in direct contrast to existing problems with feedback highlighted earlier in this paper. Importantly, analysis showed that students felt more confident about approaching the assignment, believed that

Students were clear and unanimous in their positivity regarding feed-forward

they had greater ability and knowledge to do so, and were more satisfied with the feedback process overall.

Results showed students do experience the known problems with feedback through expressing dissatisfaction with the timing and nature of feedback. This is not unexpected, considering the ample literature highlighting problems with feedback in these two areas (Evans, 2013; Huxham, 2007). Common to both themes was the assertion by students that they had nowhere to 'take' their feedback once it was received. In short, students in this focus group were viewing the process of feedback in a linear fashion (Murtagh and Baker, 2009) instead of a cyclic one (Beaumont, O'Doherty, and Shannon, 2011). In contrast, students were clear and unanimous in their positivity regarding feed-forward. Clearly the fact that students were presented with feedback formatively, and allowed the opportunity to apply their newfound knowledge and skills to the assignment, had a positive impact on their approach and attitude towards the assignment. This is evidenced by themes that emerged showing students not only felt they had achieved better grades, but also that they had gained increased ability and understanding of the task. Most importantly, and most relevant for assessing efficacy of feed-forward for novel assignments, students reported greatly increased confidence and satisfaction with the assignment. It could therefore be the case that providing students with the opportunity to practice new skills, rather than 'throwing them in at the deep end', improves student satisfaction with assignments – particularly on this type of assignments.

This speaks to the importance of allowing students to practice more traditional mechanisms of learning, and to follow a more cyclic process, that current feedback mechanisms may stifle (Beaumont, O'Doherty and Shannon, 2011). This is in direct contrast to the 'within assignment' strategies used in

this study, where the process of feeding-forward and the implications for assignment were explicit. Results from this intervention also suggest that students are more knowledgeable about *how* and *when* to apply feedback when this is presented within the assignment. In this sense, the traditional confusion that is experienced by students about how to take feedback forward is alleviated when the feedback given is related to an upcoming assignment.

This has significant implications for higher education practice, as student satisfaction across many courses and subjects could be greatly increased by including these practices within modules.

There is still a lot to learn about the process of feedback, and a number of other issues exist that were not explored in this study. For example, whilst within assignment feed-forward strategies may have an impact on student satisfaction and achievement, promoting a broader view of circular feedback between assignments still needs improvement. In addition, the timing of feedback is only part of the issue, and serious questions still need to be asked about the nature of feedback and how to promote student engagement with tutor comments and advice. Some studies have been promising in this regard (Duncan, 2007; Murtagh and Baker, 2009; Vardi, 2013), however the sector at large must make efforts to translate those into practice. Nevertheless, students who took part in this study were overwhelmingly positive about the benefits that this style of feedback had to offer. These results suggest that real improvements in student satisfaction could be achieved across the higher education sector if dialogic teaching approaches like feed-forward strategies were more fully embraced.

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Feedback, feed-forward, higher education, assignment

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INTERNAL MARKET ORIENTATION:
A SOLUTION TO STRATEGY IMPLEMENTATION IN ORGANISATIONS

Take care of your people and your people will take care of your business. Internal Market Orientation as business logic facilitates job satisfaction and commitment

Soichiro Honda, founder of Honda Motor Company, learned a lesson from his employees when the company decided to develop a low-emissions automobile engine. He affirmed that the new engine would allow the company to beat the 'Big Three' automakers in the United-States, General Motors, Ford and Chrysler. This purely business-focused aim did not seem to enthuse his employees. Nonaka and Takeuchi recount how one of Honda's young engineers objected to the founder, saying that he would work in the development of this engine, but that he would only do it to fulfil what he believed to be his social and environmental responsibilities. Another employee indicated that he would do it for his children. Mr Honda felt so embarrassed when he heard the objections that he decided that it was time for him to retire (Nonaka and Takeuchi, 2011: 65).

What can we learn from this anecdote? Managers may set very good business goals and design strategies, which can be implemented in many ways, but the attitude of employees will always play a crucial role in promoting their success. Without their commitment, strategy implementation becomes mission impossible. This is why it is so important to know what motivates employees and the impact on customer satisfaction.

Is customer satisfaction possible without employee satisfaction?

Most companies place much effort in measuring and understanding customer satisfaction and their motivations, but less energy in knowing what causes employee satisfaction. If they do not get employees' satisfaction and commitment, there are less likely to get customer satisfaction (Gummesson, 2000). If only 13% of employees are engaged at work (Gallup, 2013), could a more engaged workforce make a difference?

Managers may set very good business goals and design strategies, which can be implemented in many ways, but the attitude of employees will always play a crucial role in promoting their success
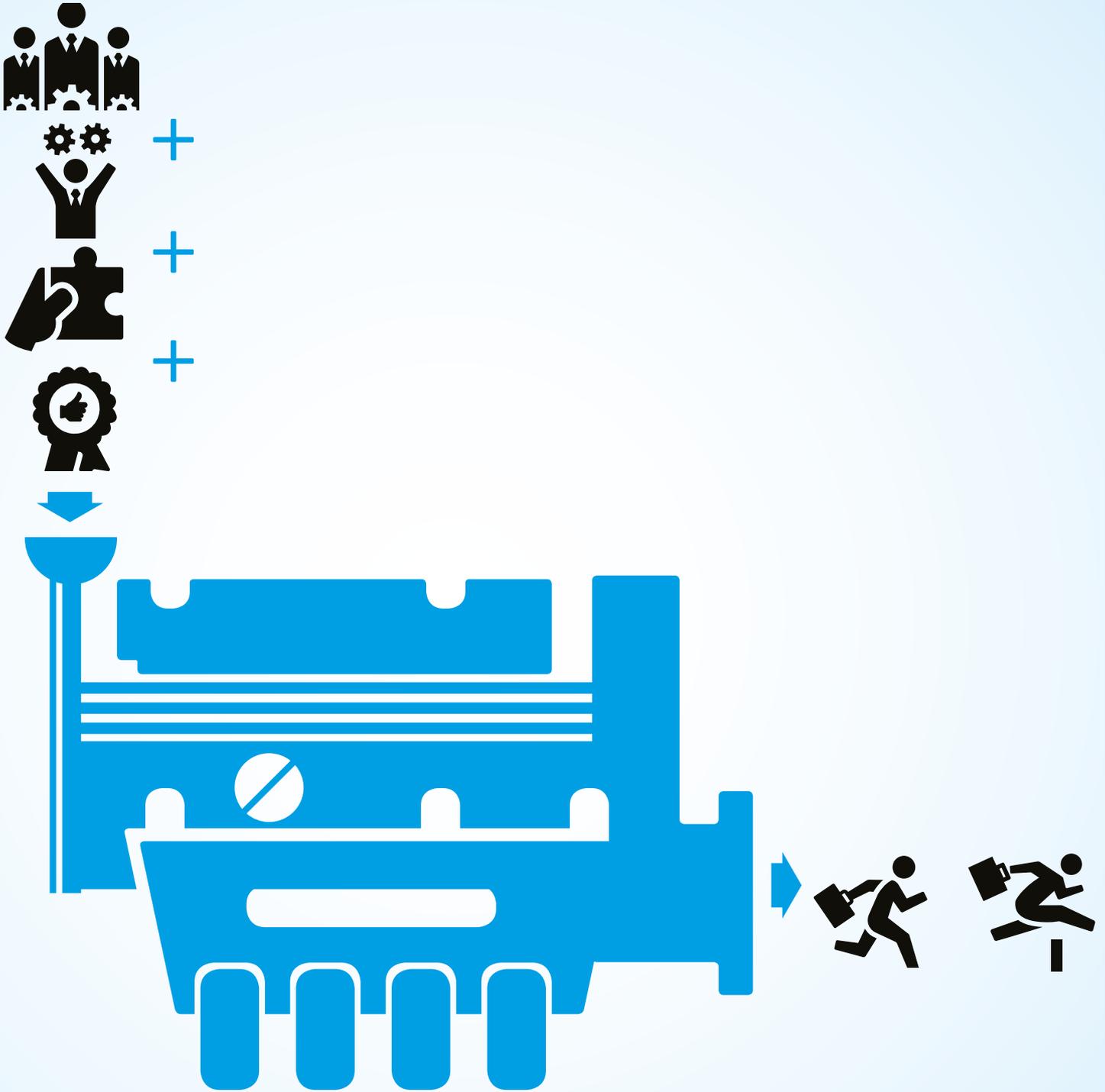
Employees assess what they receive from the companies they work for and also what the firm obtains from them, hence if what they receive is less than what they give, probably they will leave the company. Therefore, managers should monitor this relation of value interchange (Gounaris, 2006). If exchange is at the basis of marketing, it is likely that the same rule applies to the relationships between employees and employers in an internal market context.

In order to satisfy needs, companies offer value through the provision of products or services and, in many cases, a bundle or combination of both product and services. However, from a customer's perspective it is clear that they mainly seek solutions. Therefore, companies that focus on offering solutions to customers have higher possibilities of success. These solutions come through well-trained and motivated employees who, as Grönroos explains in an interview, 'keep the promises made to the market' (Ruizalba and Hafeez, 2015: 40). Solutions come from talented people, which is why competition for the best talent is so high. Solving problems and satisfying needs is a means to achieving high levels of customer satisfaction. This can only be achieved with the best talent to implement the strategy.

People at the core of strategy implementation

The building blocks and heart of good execution are people, strategy and operations (Bossidy and Charan, 2009). Energy, passion, initiative and commitment are the key drivers, which make companies, grow and will lead them to accomplish their goals. There is frequently a gap between managers' expectations and the capabilities and commitment of employees to fulfil them. Employees with high engagement can exceed customers' expectations and become real ambassadors of their brands.

Take care of your people and your people will take care of your customers

J.W. Marriot, the founder of Marriot Hotels' used to say, 'take care of your people and your people will take care of your customers'. This was his motto to generate customer satisfaction (Katzenbach, 2000: 173).

From an academic perspective, Berry and Parasuranam (1991) developed the notion of 'internal market' – i.e treating employees as internal customers to enhance business performance. Years later, Gummesson (2000) stated that achieving internal customer satisfaction is a prerequisite to increase external customer satisfaction. However, pressure to achieve results and market aggressiveness can lead to short-sightedness in managers who then ignore their employees' needs, and the consequences for their businesses.

Image © **Marriott Hotels**

Gummesson stated that achieving internal customer satisfaction is a prerequisite to increase external customer satisfaction. However, pressure to achieve results and market aggressiveness can lead to short-sightedness in managers who then ignore their employees' needs, and the consequences for their businesses
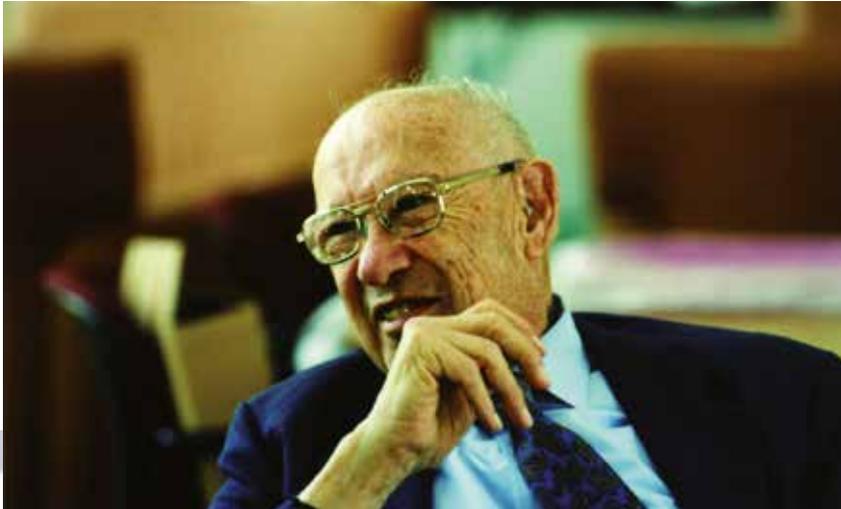
Image © Drucker Foundation

'Internal market orientation': The company seen from the perspective of the internal customer

Recently, researchers identified the concept of 'internal market orientation' (IMO) grounded on the market orientation paradigm (Kholi and Jaworski, 1990). In the context of internal market, and considering employees as internal customers, three dimensions were proposed to measure IMO: 1) internal market intelligence generation; 2) internal market intelligence communication; and 3) response to intelligence.

Lings and Greenley (2005) and Gounaris (2006) conducted empirical research on the impact of IMO in companies. The main factors analysed were: value interchange between employers and employees; internal segmentation; internal targeting; working conditions; internal communication (vertical and horizontal); training; management concern and, recently also work-family balance (Ruizalba *et al.*, 2014).

Based on Drucker (1974) who defined marketing as the company seen from the customers' point of view, I propose the concept of 'internal marketing' as the company seen from the internal customers' point of view, that is, the employees. As 'internal marketing' is built on trust, when employees trust that the firm is going to deliver what they promise. This approach facilitates that employees develop behaviours that lead to higher quality, which in turn will enrich the service delivery processes and the offer of value.

Gummesson (2000) introduced the term part-time marketers to refer to those employees who, without belonging to the marketing department, however play an important role in promoting a business due to their level of interaction with customers. For this reason, 'internal marketing' should contribute to develop internal service mentality at all levels and help employees to advance in the same direction as that of the company strategy. Following this logic, inter-functional coordination between departments like marketing, human resources, sales, and operations also plays an important role. Trying to satisfy the needs of customers whilst overlooking employees' needs would be a form of 'marketing myopia' (Levitt, 1960) which, applied to the internal market, produces what could be named as 'internal marketing myopia'.

What are the implications of IMO for firms?

Strategy includes design and implementation, and there is often a difference between what top management proclaims and what frontline employees do. Strategy execution can be more important than design itself. IMO plays an important role in strategy implementation, in particular in services as it facilitates customer orientation. One of the findings of research on IMO is that it has a positive influence on job satisfaction and employees' commitment and the three main factors that influence IMO are internal communication, management concern, and training (Ruizalba *et al.* 2014). Therefore, a first recommendation to managers is to implement action plans to improve those aspects of the business as this will also have an impact on customer orientation. Five implications for businesses that could help to take direct action in their strategy are summarised in Table 1:

1	**IMO** can improve **job satisfaction and employees' commitment**.
2	Improvement in job **satisfaction** and **employees' commitment** can contribute to higher **service quality**.
3	Improvement in **service quality** helps to increase **customer satisfaction**.
4	**Customer satisfaction** can boost **economic performance**.
5	**IMO** can be beneficial to improve **firm performance** and **employees' professional and individual development**.

TABLE 1 Five implications of IMO and firm performances

Ten key diagnostic elements to assess strategy implementation

Based on IMO factors, ten key diagnostics elements for strategy implementation can be used to analyse organisations:

1. Internal communication
2. Management concern
3. Training and support
4. Connection with employees' needs and aspirations
5. Alignment between people and business
6. Excessive control vs empowerment and trust
7. Complacency vs self-criticism
8. Focus and following through
9. Optimism
10. Clear processes

In Table 2 (on p38), I highlight some of the symptoms of both dysfunctional and excellent approaches, with some possible consequences. This can help practitioners to use IMO as these elements are IMO factors and be addressed through the three main dimensions of IMO: generating intelligence of the internal market; communicating this intelligence and responding to this intelligence.

Continuity of people and strategy implementation

Talent management is what makes exceptional organisations different from the rest. Lewis and Heckman (2006) describe talent management as a 'mindset' and an attempt to ensure that everyone at all levels works to the top of their potential. This includes attracting and retaining talent, making employees perform better, and engaging them in the design and implementation of the strategy in the long-term. IMO facilitates talent management, through the three main dimensions described before. IMO permits talent management not in general, but managing the talent inherent in each individual, for that reason IMO also plays an important role in job satisfaction and employee's commitment: two crucial outcomes of talent management that affect retention. Increasing talent retention is decisive because strategy implementation becomes difficult without continuity of people.

Taking care of employees is not in contradiction with being demanding with people as professionals. It is about establishing relationships that respect individuals' views, and where professional and personal development is a good indicator of excellent management.

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Key Elements (of Strategy Implementation)	Dysfunctional level (symptoms)	Level of Excellence (symptoms)
1. Internal Communication	Not sharing relevant information. Avoid one to one conversation. No vertical communication: downstream and upstream. Not asking for opinion. Lack of horizontal communications inter departments. Rumours. Departments as silos.	Sharing relevant information. One to one dialogue. Vertical communication: downstream and upstream. Asking for opinion. Valuable horizontal communications inter departments. Evidence, facts. Inter functional coordination.
2. Management Concern	Lack of respect. Interest as resources not as individuals. Help always expecting return. Utilitarian focus. What employees achieve not what they are. Rudeness.	Respect. Interest as individuals not as resources. Help not expecting any return. Non-utilitarian focus. What employees are, not only what they achieve. Politeness.
3. Training and support	Lack of training or designed just to "tick the box" and to be covered. No Mentoring. No Coaching. Excessive workloads.	A lot of training and designed to be useful. Mentoring. Coaching. Balanced workloads.
4. Connection with employees' needs and aspirations	Managers ignore the needs and aspirations of employees.	Managers make efforts to understand the needs and aspirations of employees.
5. Alignment between people and business	Wrong/right people in the wrong place and at the wrong time. Misalignment between skills and tasks. Misalignment between jobs and individuals.	Right people in the right place and at the right time. Alignment between skills and tasks. Alignment between jobs and individuals.
6. Excessive control vs empowerment and trust	What is not permitted is forbidden. Managers as bottle-neck. Culture of blame and fear.	What is not forbidden is permitted. Managers as multiplier effect. Culture of trust and assurance.
7. Complacency vs self-criticism	Complacency. Lack of recognition. Resistance to innovation. Risk aversion.	Our competitors are good at something. Humility. Recognition. Openness to innovation. Prudent risk taking.
8. Focus and following through	Ambiguity in the "ownership of tasks" (unclear who is responsible). Task without deadlines. Dispersion. No priorities. Everything is urgent. Vagueness in objectives.	Certainty in the "ownership of tasks" (clarity as to who is responsible). Clear deadlines. Focus. Priorities. Few urgent things. Clarity in objectives.
9. Optimism	Managers do not smile or fake smile. Focused on threats. Negative messages. Disillusioned climate.	Managers with sincere smile. Focused on opportunities. Positive messages. Climate of enthusiasm.
10. Clear processes	Chaos. Anarchy. People do not know how to proceed. Heterogeneity in service delivery. Inconsistency.	Order. Harmony. People know how to proceed. Homogeneity in service delivery. Consistency.
Possible Consequences	**Knowledge in individuals. Chaos. Mobocracy. People as a means. Suspicion. Low engagement. No dialogue. No initiative. Job dissatisfaction. Lack of commitment. Lack of enthusiasm. Low accountability. Negative attitude. Burn out. High turnover. No continuity in projects. Anxiety. Low performance.**	**Knowledge in the organisation. Transparency. Order. Meritocracy. People as an end. Certainty. High engagement. Dialogue. Initiative. Job satisfaction. Commitment. Enthusiasm. High accountability. Positive attitude. Great place to work. Low turnover. Continuity in projects. Flow. High performance.**

TABLE 2 Key elements of strategy implementation: dysfunctional and excellence levels

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STUDENT PROFILE

Jiva Nath Bagale

Course
PhD in Computer Science,
University of West London, UK

Year completed
2015

Title of thesis
On the performance of emerging wireless mesh networks

In his thesis Jiva studied wireless mesh networks with an aim to improve their performance when collecting and communicating sensor data. He investigated the limitations and challenges of low-bandwidth wireless mesh network to communicate sensor data. This research was driven by the fact that low-bandwidth networks is used increasingly in many aspects of everyday life. They are being used for example in healthcare, industrial automation, and environment monitoring. The data to be communicated can be as varied as room temperature, heartbeat, user's activities, or seismic events.

The research generated a light-weight data communication system which can be used to transfer sensor data in wireless mesh networks. The main objective was to increase the amount of sensor data communicated in real-time without affecting energy usage on the device. He examined messaging protocols that are suitable for embedded devices and devised a messaging model to communicate sensor data. He then utlised data compression techniques that can be used on devices with limited resources and that are suitable to compress typical sensor data. Data size, data transfer time, and energy consumption were evaluated to highlight the advantages and limitations of those techniques. The impact on the scalability of such networks was also evaluated.

The thesis makes a number of technical contributions to the body of knowledge on energy savings by the use of data compression and clarifies the understanding of energy consumptions of compression and network transfer. The system also allows to create bigger scale networks of sensors or mobile devices to communicate data in real-time.

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