Self-organisation as quality control in inquiry

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Abstract

Knowledge is defined as the result of successful attempts to transfer expected effort in the future to effort spent in the present. The less effort remains to be spent in the future, the more knowledge is exhaustive and complete. It is shown that some efforts remain necessary in the future for accidental reasons, e.g. to correct mistakes, to estimate parameters, to act. Some efforts will also be required for fundamental reasons. They are needed to compensate as and when testing for exhaustiveness proves ineffective. It is argued that the need for such additional effort may be met by starting collectives as a form of pre-containment. Such collectives may include non-ordered experiences. They will maintain themselves by striving to serve as equivalents to knowledge. They help in two ways: they indicate what is needed to create which knowledge. The design of collectives serving as knowledge is linked to second order cybernetics.

Keywords: Projects, knowledge, collectives, second order cybernetics

1. Introduction

While technological changes have occurred at all times, the majority appears to been introduced in the last few decades – and to have deeply influenced what we do, from talking to others to making wine. Although many of these effects are considered desirable, they also have been criticised, often in terms of an alleged accompanying loss of humanity (Renaut, 1997).

The obvious question is how such negative effects may be avoided, or less ambitiously, whether their impact can be reduced. Another question may replace it – a wider one, but also possibly easier to answer, namely what is to be done about social ills, including helping the disadvantaged, the disabled, the victimised and the socially excluded or de-privileged.

Both questions have been answered in terms of individual as well as collective ways of coping with negative social effects. It has been claimed that they are due to the way of thinking that underlies technology, which thus has to be rejected (Heidegger, 1949). It also is claimed to result from a process of individualisation, leading to 'calculating citizens' (De Swaan, 1988).

There are obvious drawbacks to these answers. Rejecting technology implies rejecting advantages such as control of diseases, increased food production, more effective forms of policing – and usually also providing extra benefits to the privileged classes. 'Calculating citizens' aim to profit beyond their needs, and tend to initiate social catastrophes.

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There is a large area of endeavour that may be called the research approach, mainly with the aim to understand how negative social effects occur. Results tend to take the form of *theories* – that identify units of analysis as well as their variable properties, and are designed to change some of the latter, as tools to change others that are more difficult to change or to observe.

Unfortunately, this approach remains mainly unsuccessful. For one thing, it has been criticised for being based on the same principles that summarise technology – being able to identify units with a clear identity and boundary – whereas humans transcend any property attributed to them (Foucault, 1970). For another, it proves difficult to identify the appropriate variables.

These difficulties have not stopped the endeavour, only stimulated towards alternative approaches and modifications. They include what is called action research, participatory problem solving, management methodology and the like (Dash; 1999; Tandon, 1996; Argyris and Schön, 1991). These approaches leave space for individual contributions, while geared to prevent social ills.

Usually the form chosen for implementation is that of *projects*, the result of planning, administrating and co-ordinating the activities of various groups of individuals, to achieve desired effects. Projects tend to require large resources – large enough to have to be generated outside the projects, for example as funding under the remit of governing bodies.

The project approach has proved successful in many respects, even to having spawned an industry of evaluation studies concerning national and international development projects as well as concerning project management (Sauer, 1999; Hayek, 1945; Checkland and Holwell, 1998). As many social ills tend to persist, improvements appear needed.

In this paper-an attempt will be made to link projects with the use of theories, or knowledge acquisition, with the aim of achieving such improvements. At least two clear advantages are envisaged. Politicians will get support – as they may be able to make use of improved tools. Researchers may find their advantage in clarifying the notion of knowledge.

Designing projects appears to be better known than acquiring knowledge. Many people are able to identify activities as ‘their’ projects (growing the biggest melon, climbing a mountain). Project design also seems to come somewhat naturally. Basically, what is involved is controlling the use of one’s means to achieve one’s (well-defined) goal.

The paper starts, therefore, by exploring the notion of knowledge as it appears in mainstream understanding. In sections 3, 4 and 5 I intend to characterise knowledge in its widest sense, without having it lose its identity. Next I explore how projects may be turned into a search for knowledge, or inquiry (section 6). Some conclusions follow.

2. Basics

Definitions of knowledge abound (Popper, 1959; Churchman, 1971; Schön, 1983). Mostly it is said to relate to creating new experiences and recognising and transmitting those of high quality. Creating experiences is not unusual and often highly regarded, whatever their nature. Fanatics especially seem to keen to link our experiences of the world and its ways to experiences of love.

There seems little reason to reject any link. We may link our experiences to love, but also to other experiences, even simultaneously and stably. We even tend to categorise people according to the links they favour. Politicians and shopkeepers are expected to link desirable experiences, one to the other – so clients, followers and customers succumb and buy.

These examples show extreme variety. Links may be variable, unusual or stable over time and over individuals. There are differences of taste. Links may be preferred over others, always or sometimes. Linking a feeling of peace[2] to reading while sitting beside the fire seems different from linking certain lights in the sky to planets and others to stars.

The search for links that *do not* differ for different people at different times, but are detached from those aspects, was started in the 17th century. It continues as what we call science, or the search for knowledge, or for high quality links. Such links are directed in that they link *primary* experiences to *secondary* ones, so the latter will help recognise new primary experiences.

As an example one may think of links between symptoms and syndromes (Bindels, 2002). The latter help identify or understand how the symptoms are linked and where one may intervene. Another example would be our experiences of the sun and planets circling the earth linked to our experience of the earth and the planets circling the sun.

High quality links are expected to stay the same, whoever uses them, and to be *democratically accessible*. It may seem strange to emphasise democracy in this context. Usually it is highlighted that who knows ‘owns’ power. Links may be accessed by anyone, however, hence democratically, to overcome other powers, e.g. those possessed by priests and princes.

This characterisation does not exhaust all properties. Knowledge continues to be widely discussed. It does seem possible, however, to identify properties, the absence of which would damage our intuitive understanding of knowledge – the main one being the search for high quality links. These properties should help identify how to turn projects into inquiry.

3. Searching for quality

A first and widely recognised characteristic concerns what knowledge is meant to contribute. It is meant to serve as a *pre-construction*. It implies spending efforts in the present to avoid spending in the future (Rosen, 1993). The result can be thought of as a construction, the identity of which is maintained over time. The construction thus should be stable.

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[2] [illegible]

Being stable does not mean being invariant. The construction may change, but in order to function as a pre-construction, there should be no need to repeat in the future effort spent in the past. This property obviously is an ideal. Sometimes some efforts need to be repeated (for example adapting parameters to changing contexts), while others do not.

There are other reasons to continue to spend efforts in the future, even though one tried to spend them in the past. One may have made mistakes, which have to be corrected by future efforts. Or one may find that constructions change due to the impact of their use by others. Such changes have to be neutralised by future efforts.

To acquire knowledge one may simply start with some link, and attempt to reduce future efforts. This may prove to be a rather slow and expensive approach: it would be more efficient if we knew where to start. This would require that we are able to recognise – or test – levels of pre-construction of any link more quickly than we can pre-construct.

Elaborating a bit, one may note that whatever the link one is searching for, the primary experiences needed to transfer efforts can be but finite in number. The same holds for secondary experiences. However, for a link to exhaust all future effort (reduce it to zero) the latter experience should help recognise a non-(de)finite, possibly infinite, number of primary experiences.

4. The first difficulty

This kind of in-(de)finity provides a first difficulty. Testing a possibly infinite number of primary experiences must take place in the present – which means that we need another pre-construction to test our pre-constructions.
To emphasise this point we may describe links using the notion of a set (primary experiences) and its elements (secondary experiences).

Unfortunately, a set is defined by enumeration of its elements – which we do not know yet. The concept of a class may be of help here. A class is defined by a propositional function, or indeed, a pre-construction to recognise new experiences. If it is recognised as a secondary experience, it may help to identify all (future) primary experiences.

Although this notion may have clarified the difficulty, that hasn't gone away. Testing still cannot be exhaustively pre-constructed. Another approach is to link secondary experiences to the *method* of testing links. The candidate to consider is a Turing Machine, a device called Universal when it is meant to specify physical limits on any such method (Hodges, 1997).

This machine is defined as reading from a tape (partly blank, partly containing symbols[3]). It may change what was read, selecting an operation from a finite (behavioural) table. A (propositional) function is considered effectively calculable if its values can be (re-)produced or printed, using such operations and starting with a blank tape.

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[3] Reporting an observation is assumed sufficiently 'immediate' so it may be mapped on, and

What this says is, firstly, that the number of (primary) experiences against which a function *has been* tested, will be finite at all times – if it is calculable. This does not imply that we know when this number is sufficient. Secondly, that it will be (similarly) impossible to formulate a rule that says to stop when some (pre-specified) approximation has been achieved.

The above again seems to clarify, but not to fully resolve the difficulty of testing. We may seek recourse to Popper (1959). He adds a (any) person to do the test, who must *strive* to recognise experiences that are like the primary, but are not recognised by the secondary experience (falsify it). If such experiences are found, a new (or re-) formulation of the latter is needed.

This proposal is interesting as it tries resolving the first difficulty indirectly, by introducing individuals who are able to *self-organise* so as to be *alert* to new errors, falsifications and the like. We still have to clarify, however, what the striving person is able to add, and to what extent this extra is sufficient to resolve the difficulty.

5. The second difficulty

Persons have been introduced before, of course. They were the source of reports of experience that are to be compared, linked to other (secondary) reports, and the links tested – in the process of knowledge acquisition. They were outside that process, however, providing an input to a process, the secondary experience of which can be mapped onto a machine.

The notion or experience of a person who is striving introduces a new and different type of secondary experience. This notion refers to an *actor*; and actorship may be linked to reported observations concerning the process of knowledge acquisition (i.e. of linking primary and secondary experiences and as testing for high quality itself).

This actor is linked to a complex task. He or she must organise the process of striving and testing to produce what he or she may report to others as knowledge. He or she eventually also must know that knowledge, and in that sense be able to test his or her own knowing. The result of all this should, of course, be democratically accessible, as defined.

To get to know whether the person's activities add something to what the Turing machine allows for, we must consider a *second actor*, trying to link the person striving and testing to another secondary experience, that of someone acquiring knowledge about someone who is trying to acquire knowledge (as indicated, by testing).

There is reason to doubt that this second type of secondary experiences can be recognised as an effectively calculable (propositional) function. This brings us to a second difficulty in testing. Together the two actors construct experiences (symbols) that cannot be produced on a Turing machine, as their two functions will influence each other (von Foerster, 1970).

This combination is not as unusual as one might think. Watzlawick (1989) describes what happened when two psychotherapists were told that the other

had to be cured from thinking that he was a psychotherapist. Their session did not result in understanding or knowledge, as the efforts of each to find a computable diagnosis was frustrated by similar efforts of the other.

To produce knowledge in situations like these (albeit about testing), something other than a striving person appears necessary. The obvious candidate is a *striving collective*. It should implement the process of testing to produce what may be reported to others as knowledge. Eventually it must *have* that knowledge, and in that sense test its own knowing.

This task appears even more complex than that of a person striving and testing. If a collective is to 'have' knowledge, it seems that it also must *be* that knowledge – must be its (changing) repository. If so, the experience of the collective must be democratically accessible. As a pre-construct it must be stable and exhaustive (Pask, 1991; de Zeeuw, 1995, 1998).

Both are achieved when the actors interact: *act* to test secondary experiences concerning knowledge acquisition by other actors, and *test* links on whether they constitute knowledge. Collectives thus will be experienced as the result of members acting and testing. As interaction is mutual and simultaneous, members will not be able to distinguish who is doing which.

Collectives depend on members providing each other with opportunities to experience their cohesion over time. This means that such opportunities must be qualified, restricted so only experiences that maintain the collective are retained. It is said, therefore, that collectives regulate the qualifications, and hence the *competences* of their members.

This notion of a collective is designed, as artwork; it is not a description of actual collectives like social communities or projects. It is based on the process of searching and testing for high quality experiences, as well as on improving or finding such experiences. In other words, it is conceived as built up out of actors who interact by experiencing each other's actions.

6. Bridging the gap

The notion of a collective was developed in the process of trying to test whether a person striving to falsify is sufficient to test knowledge. This appears to be so if knowledge can be mapped onto a machine, or, alternatively, if that person is a member of a collective that self-organises to be stable and exhaustive on the level where it is democratically accessible.

Projects have developed mainly to deal with situations where (Turing) machine-like testing is ineffective. This suggests an obvious route to making projects more like inquiry. Their members must strive to become a collective with the above task. Doing so involves the following steps – part of what is called second order cybernetics (Glanville, 2002; Umpleby, 1990).

The first step is to bring together persons as members of the collective. The second is to introduce a co-ordinating system that allows for actions and testing to become coherent, and for collective stability. The third is to ensure that at all

times experiences are sought that may subvert the collective, but to which the collective will try to adapt to remain stable.

At this point in the argument it may appear that the transformation of a project into an inquiry is somewhat obvious: just some steps. It isn't – as testified by the general lack of such transformations, and by the continuing insistence on developing projects, in the context *of* research rather than *as* research (Erlandson e.a., 1993; Reason, 1981; Checkland and Holwell, 1998).

There may be other reasons not to prefer such a transformation, as exemplified by evaluation studies (Guba, 1990). Such studies only aim to check whether projects achieve what it is meant to achieve, as funding may be substantial and repeatable. Examples include projects in developing countries.

In line with the aim of the evaluation one proceeds by comparing the effects of a project at some moment in time, usually the end, with the desired or planned effects. In 70% of cases there is a difference; the plans have not been realised (Robinson and Leroy , 1988). The difficulty is that it often is not clear what lack of success means. One cannot decide whether to repeat, or to continue, etc.

A more useful approach would be to see the action the evaluation is needed for as the secondary experience, and the experiences in the project as primary, and to test whether pre-construction is possible. Testing usually cannot be very extensive, and any use of the results will require additional effort. The question is what kind of effort to prefer in this case.

The advice would be to transform all similar, future projects into inquiry, by creating a collective that 'contains' the results, even when negative, and is able to acquire knowledge to improve on them. The steps to do so have been summarised above. They have been successfully followed, e.g. by Vahl (1994), to transform a failing project into a self-improving organisation.

Another example where second order cybernetics, or at least the approach delineated above, has led to useful results involves trying to link behaviour within the Prisoners' Dilemma Game to altruism (as secondary experience). What is minimally required is creating a collective; iteration allows players to communicate and hence realise the link (Axelrod, 1984; Howard, 1971).

Collectives are meant to be democratically accessible, and hence stable. As indicated before, this means that effort is needed to maintain the collective. This may include effort to prevent defection, to correct mistakes, to 'police' the process of striving for stability. Without such effort the collective may fragment and the knowledge involved disappear (Turnbull, 2000).

7. Conclusion

This paper started from noting that there are many social ills that are difficult to deal with, or already consist of the negative effects of interventions intended to have positive effects. Attempts to reduce negative effects often take the form of *projects*. These tend to impose constraints chosen to achieve success – but without attending to maintenance.

The question was raised how to transform projects so they generate *knowledge* that is stable over time. It was answered by exploring the notion of knowledge, especially how it might be tested. It proved necessary to expand on the notion of testing by way of self-organising collectives, precisely what projects should be transformed into.

The use of the notion of such collectives suggests a series of steps to implement the transformation. It was noted that this transformation is like, or possibly equivalent, to the basic processes in second order cybernetics. Some examples were presented to exemplify the nature of applications, as well as its power to answer research questions.

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