REFLECTION ON THE FUTURE:
ITS POSSIBILITY AND USEFULNESS

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ABSTRACT

This paper examines whether reflecting on the future is an activity that is distinct from reflecting on the past or present, and, if so, what are its distinguishing characteristics. The argument begins with a review of Dewey’s (1933) concept of reflective thinking, still not surpassed in its detailed analysis. Dewey’s model of reflection is discussed and some limitations noted. An alternative model to Dewey’s, labelled “reflection as comparison” is outlined, and shown to include the essential components of Dewey’s model, while also extending it to cover assumptive filters. An important role of reflection is to articulate these filters. To demonstrate the reflection-as-comparison model, a case study is presented: a feasibility study for an online community information system in rural Australia. This is asserted to comprise reflection on the future in that it considers alternative futures, actively seeks to identify and bypass assumptive filters, and reperceives this problem situation as a set of interlocking social systems as well as an online information system.

REFLECTION ON THE FUTURE

Given the long lead times and life cycles of IT projects, Information Systems managers need to reflect on the future. This paper considers the possibilities of reflection on the future: whether this is an activity that is distinct from reflecting on the past or present, and, if so, what are its distinguishing characteristics. The paper distinguishes two kinds of future: future as extended habit, and future as taking new, unpredictable paths. The focus here is on the latter kind of future, which is often more relevant in the development of complex information systems. By creating a new perspective of reflection, labelled the “reflection-as-comparison” model it becomes clear that reflection on the unexpected future is possible; and a later case study demonstrates the usefulness of this model of reflection.

THE NATURE OF CRITICAL REFLECTION

Though the online encyclopedia Wikipedia offers 10 distinct meanings of “reflection”, this paper focuses on the meaning attributed for education - summarized by the Wikipedia as simply “the art of turning experience into learning” (Wikipedia 2005). Reflection appears to have first been used in this sense by Dewey (1933), in parallel with the more explicit term “reflective thinking.”

The Shorter Oxford English Dictionary defines reflection, in the context of
philosophy: “the mode, operation, or faculty by which the mind has knowledge of itself and its operations, or by which it deals with the ideas received from sensation and perception” (Oxford 1973). The first reference in this sense was dated 1690. However, the original sense of reflection was the optical, which the Shorter Oxford dates from 1555, and defines as “The action, on the part of surfaces, of thrown back light...falling upon them” (Oxford 1973). Given this primacy of the optical sense of the word, this paper uses an optical metaphor to illuminate the philosophical meaning.

Though reflection in the philosophical sense has a very long history - for example, it is very close to the theoria of Aristotle in his Nicomachean Ethics (Russell 1961) - this discussion begins with the work of Dewey.

**Dewey’s model of reflection**

Dewey’s book How We Think appears to be still the most comprehensive work written on reflection (from a philosophical standpoint). The first edition of How We Think was published in 1910, with an enlarged and slightly revised second edition in 1933.

According to Dewey (1933, pp.107ff), “reflection occurs when one thing signifies or indicates another.” Dewey here is suggesting that full reflection produces a theory of cause and effect. For Dewey, reflection begins with a “perplexed troubled, or confused situation,” and then entails five phases:

1. Suggestion: the mind leaps forward to a possible solution. If the solution seems feasible, it is applied, and full reflection does not occur. Otherwise, these phases take place:
2. Intellectualization of the perplexity into a specific problem to be solved or question to be answered: i.e. placing the perplexity into a relevant context;
3. Development of a hypothesis to guide observation in collection of empirical data;
4. Elaboration of the hypothesis, or “reasoning”;
5. Testing the hypothesis, either by overt action or thought experiment.

Phases 3 to 5 are different in kind from the first stage. Dewey (1933, p.109) notes phase 2 as “a process of intellectualizing what at first is merely an emotional quality of the whole situation.” In phase 3, having transferred the “perplexity” into a coherent “problem”, counterfactual thinking can be applied. Dewey notes (1933: 115) “the sequence of five phases is not fixed” - they need not occur in that order, and they need not all occur.

Three limitations can be noted on Dewey’s model of reflection: firstly, it applies to “thinking,” and thus to individuals. There is no explicit reference in How We Think to the idea that reflection could be a collective activity, achieved through discussion. Secondly, Dewey’s model is a proposition (how reflection can occur) rather than a statement of empirical fact (how reflection does occur): perhaps other processes are possible, and perhaps How We Think should have been entitled How I Think. Thirdly, Dewey presents reflection as an entirely intellectual process, with no affective or intuitive element.

Part of Dewey’s argument is that humans are prone to leap to a single conclusion, and not waver from it, even in the face of contrary evidence. Experimental work
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(for example, by Kahneman, Tversky, and Slovic, 1982) tends to support this contention. Many other sources could be cited here, including other writers on cognitive psychology and evolutionary psychology, as well as Freud and Wittgenstein, but space precludes a detailed study of this point.

Successors to Dewey

Building on the work of Dewey, several writers have addressed the three limitations noted above. Heron (1996), in his model of co-operative inquiry, allows for both individual and shared reflection. Co-operative inquiry begins with individual reflection by several participants, who later compare those reflections in a shared-reflection session. Kemmis (1985, p.141) is more explicit: for him, “reflection is not a purely ‘internal’, psychological process: it is action-oriented and historically embedded.” And of course, if reflection is extended beyond one individual, it becomes discussion, which can be treated as an argument, becoming subject to the constraints and possibilities of argumentative inquiry (Walton, 1998). Mezirow (1981), after interviewing women returning to college, empirically delineated 10 stages of what he calls “perspective transformation.” These are similar to Dewey’s five phases, though naturally more detailed. Recent writers, including Boud, Keogh, and Walker (1985), have argued that the affective element must be considered, particularly in the context of reflection in education. They list a sequence of three phases of reflection (not reported as being based on empirical work): returning to experience, attending to feelings, and re-evaluating experience.

All three of these extensions of Dewey’s thought were found useful for incorporation into a variant model, to be described next: namely, that reflection can be either an individual or a group activity, that it can include an affective component (just as it can include near-formal hypotheses), and that plausible alternative sets of phases may be delineated.

Reflection as comparison

With the aid of an optical metaphor, I shall now propose an alternative model of reflection, less hypothesis-oriented than Dewey’s prescriptive definition, but more in accordance with the dictionary meaning of the term. This model, which can be labelled “reflection as comparison” involves three elements, as shown in Figure 1: a reflector (the person or group reflecting), the existing situation, and a standard situation. In this model, the reflector compares the existing situation with a standard situation - which may be a past experience of the same phenomenon, a similar situation in another domain, or a desired goal. The focus of reflection is why and how the current situation differs from the standard. Varying the standard situation and/or the difference between that and the current situation corresponds to Dewey’s stages of hypothesis formation and testing.

![Figure 1: The reflection-as-comparison model](image-url)
Translating the reflection-as-comparison model into the closest equivalent of Dewey’s five-phase model, both begin with the reflector experiencing perplexity. For the reflection-as-comparison model, the stages are:

1. The reflector perceives (through a filter) a current situation, as problematic in some way.

2. The reflector perceives (also through a filter), an initial “standard situation” as comparison. This standard situation can have several sources: it may be a leapt-to conclusion, it may reflect past experience, or it may be a desired future situation.

3. The reflector considers what changes might be necessary to bring the two situations into alignment. This can be achieved in any combination of three ways:
   3a. Reperceiving the current situation, by varying its filter (perhaps, after considering the alternatives, it may not be a problem after all).
   3b. Changing the standard situation, by adopting a different standard for the comparison.
   3c. Reconfiguring the possible changes needed to bring the two situations into closer alignment.

Applying this model to Dewey’s example of “practical deliberation” (Dewey 1933, p.91):

1. The reflector perceives a current situation: that he is running late for an appointment. (His filter includes the assumptions that the clock on 16th Street is correct, and the affective component that the appointment must be kept: that it is not possible to arrive late, nor to modify the appointment.)

2. He perceives a standard situation “due at 124th Street by 1pm.” Filter: the assumption that his memory is accurate.

3a. Reperceiving the current situation: perhaps the clock on 16th Street had previously proved inaccurate.

3b. Varying the standard situation: might it be possible to find a public telephone and change the time of the appointment?

3c. Considering actions that would bring the two situations into closer alignment: such as taking the subway express rather than the elevated line.

Though the reflection-as-comparison model does not step through Dewey’s five phases, the end result is the same, and the addition of the filters is potentially useful. (However, the reflection-as-comparison model does not fit closely with Dewey’s other two types of reflection, involving observation and experiment.) Lewin’s (1946) form of action research involves cycling between planning, action, and reflection. In both the reflection-as-comparison model and Dewey’s five-phase model, the reflection component is much broader than the narrower concept of reflection, as described by Lewin, and almost equivalent to an entire action research cycle (List 2006). Dewey’s view of reflection, as noted above, has been interpreted by later writers, such as Kolb (1984) and Korthagen (2005) as a cyclical process - though Kolb’s cycle of “experiential learning” is rooted as much in the writings of Jung (on personality types) and Lewin (on action research) as in those of Dewey. Though it is possible to criticize Kolb in this regard (as does Miettinen 2000), it is clear from Dewey’s five phases that recursiveness is possible. For example, if the hypothesis formed in phases 3 is not confirmed in phase 5, the reflector may return to phase 3 and form another hypothesis.

Filters to reflection

In terms of the optical metaphor, the filters through which the reflectors see the two situations are equivalent to refraction as well as reflection. As noted by Mezirow (1991, pp.101-102 and 114) Dewey did not take account of this “framing”, as Mezirow and Schön label it. Different contexts will call forth other refractions, as noted by many writers discussing related concepts using different labels. These include the double-loop learning of Argyris, Putnam, and Smith (1985), the critically heuristic boundary questions of Ulrich (2000), the critical reflection of Kemmis (1985), the premise reflection of Mezirow (1991), Morgan’s...
(1997) images of organization, the work of Linstone (1999) on multiple perspectives, the “designed blindness” described by Friedman (1992) in relation to program theory, and the “undiscussables” addressed in Appreciative Inquiry (Cooperrider, Whitney, and Stavros 2004). Continuing the optical imagery, it is as if coloured glass filters were placed between the reflector and the two situations, as shown by the thick horizontal lines in Figure 1.

Though it might be considered desirable to remove the filters (or at least replace them by clear glass) this will generally not be feasible: there are simply too many aspects that could be reflected on. A selection must always be made - wittingly or unwittingly - with the attendant risk that some vital aspect is overlooked. And as Kemmis (1985, p.147) notes, “reflection is shaped by and shapes ideology.”

The filters in Figure 1 correspond to Kemmis’s concept of ideology, with the reflector perceiving only some aspects of the current situation, and only some aspects of the standard. However, ideology is only one reason for limiting reflection; simple lack of foresight is another. Ideology does not change easily, but lack of foresight can be acknowledged with a statement such as “Oops! I didn’t think of that.” Thus Kemmis’s (1985) statement could be extended to “reflection is shaped by and shapes assumptions.” Filtering seems to be inevitable; even were it possible to remove all assumptional blinkers, the pressure of time would serve to limit the extent of reflection. As Alvesson and Skjöldberg (2000, p.246), noting the correspondences between reflection and reflexivity, observe, “the whole idea of reflexivity, as we see it, is the very ability to break away from a frame of reference and to look at what is it not capable of saying.” In terms of the reflection-as-comparison model, this function is performed by changing the filters.

If (as often) the comparison is a normative one, the reflector will be seeking change: a way to vary the current situation (or its successor) to more closely resemble the comparison situation. Figure 1 may be compared with Ulrich’s (2000, p.252) triangle of facts, values, and system, with the Reflector here roughly equivalent to Ulrich’s system, the current situation corresponding to Ulrich’s facts, and the comparison situation with Ulrich’s values.

This reflection-as-comparison model is compatible with Dewey’s definition, as summarized above, and explained in detail in chapters I and VII of Dewey (1933). The “standard situation” can be either a desired state of affairs, or a current hypothesis. This model is similar to ideas that are expressed by Morris and Moore (2000), and Lynch and Joham (2004), but that are not explicitly spelled out by those writers as a basis of reflection.

**Reflection as a group activity**

As noted above, Dewey conceived reflection, perhaps because his filter was “thinking”, as an individual activity. Even in the chapters on pedagogy, collective reflection was not mentioned. Recent writers on reflection and reflective thinking, such as Kemmis (1985), and Heron (1996) almost take it for granted that reflection can be a collective activity. Raelin (2001) notes that “Taylor (1997) even suggests that without the medium of relationships reflection can be impotent and hollow, lacking the genuine discourse necessary for thoughtful and in-depth behavioral change.” In the reflection-as-comparison model, either individual thinking or collective discourse can form the basis of reflection.

**Reflection and intuition**

A limitation of Dewey’s model is its intellectualist treatment of reflection, as if every reflector is a scientist, forming explicit propositions, then testing them. Though this is certainly one way of dealing with a problematic situation, it is not the only way. Other writers, including Ryle (1949) and Polanyi (1958) have argued that much human knowledge is tacit: unable to be expressed verbally, and thus not testable using Dewey’s five phases. Recent writers on tacit knowledge have written of a connection between that and reflection. Thus von Krogh, Ichijo, and Nonaka (1996) describe a four-stage process of conveying tacit knowledge by using reflection to translate it into explicit knowledge, then back again. Similarly, Raelin (1997) observes that reflection is the process
by which tacit knowledge is converted into explicit knowledge.

Though it would seem unproductive to unilaterally redefine reflection to include intuition, it is possible to envisage an intermediate state, that might be labelled “intuitive reflection”. This is a matter of mentally juggling the perceived problem, a standard situation, and the changes necessary to bring the two into closer alignment.

As an example of tacit reflection, I may hear on a radio program a snatch of unfamiliar classical music. (The problem situation is that I do not know the composer, and wish to.) After a few seconds’ listening, I form the opinion that it is definitely by Beethoven. (So the standard situation is that this is a work by Beethoven). Though I have never heard this work before, I not only know the composer, but I know that I know it. Such a feeling of certainty, on experiencing only a tiny part of a pattern, is one form of intuition. (There’s a slight chance that I am wrong; the music might be a pastiche - but I dismiss that.) Step 3c in the reflection-as-comparison model (bringing the two situations into alignment) is not consciously needed here: it occurred intuitively. Later, I realize that my doubts about the possible pastiche can be resolved by changing the problem situation (step 3a): my certainty is not that the music was by Beethoven, but that it was in the style of Beethoven.

Since Dewey (1933, p.9) defines reflection as “active, persistent, and careful consideration”, this example, in his terms, did not amount to reflection. This demonstrates that the reflection-as-comparison model can accommodate this more intuitive form of reflection.

**Futures and predictability**

The basis of my argument is that in many respects the future is very similar to the past: neither can be fully known, and neither can be directly perceived. In addition, the shorthand forms “the past” and “the future” are equally misleading. Since both exist only in the mind - as observed by philosophers as far back as Saint Augustine, (397) - there are as many futures (and pasts) as minds. Because of socialization, these pasts and futures may not vary greatly within a culture, but the further they are removed from the present, the more varied are those perceived futures and pasts.

The main thrust of recent writings on “futures thinking” (always in the plural) is that many futures are possible. This position is demonstrated by most of the contributors to the authoritative Knowledge Base of Futures Studies (Slaughter, 1996) and permeates the theoretical work of Bell (2003). Allowing, then, that there are multiple futures in two senses, how can this be reconciled with the short-term accuracy of much forecasting (Armstrong, 2001)? The obvious resolution is a model of increasing divergence. The following figure depicts this graphically, with time running from left to right. The dotted vertical line denotes the present, while the horizontal line on the left shows the recent past and near future. For a short time, the future continues, as effectively a single line, but as probabilities of change begin to snowball, a number of ever-more-divergent possible futures appear.

![Figure 2: From future to futures](image)

Despite the popular view that it is impossible to predict the future, elements of the near-term future are often quite predictable. From forecasting the number of primary school enrolments five years from now, to predicting how a frequently-seen streetscape will look tomorrow morning, much of the short-term future is either (all but) pre-ordained, or will vary within only a tiny range. The more general a prediction, the more likely it is to be true. If I predict that tomorrow in this city, there will be between 1 and 3 millimetres of rainfall, I am very likely to be wrong. But if I extend the prediction by multiplication to the whole of this year,
guessing between 365 and 1095 mm, I’d have been correct every year for the last century.

The relevance of this line of thought for reflection is that two kinds of future can be distinguished: the apparently straight line on the right of the present in Figure 2, and the diverging curves farther to the right. The first represents the future as habitual or cyclical, the second as less predictable. Thus because of the cyclical and repetitive aspects of much human behaviour, much of the near future will be essentially the same as the recent past. (For clarification, I am of course exaggerating the difference between the “two futures” - in reality, the first shades into the second.)

Is it possible to reflect on the future?

It may at first seem impossible to reflect on the future: how can one reflect on something that has not occurred: does not Dewey’s model of reflection preclude reflection on future events? Though it may be interpreted thus, Dewey does not seem to have made such an interpretation. Each of the three examples of reflection given by Dewey (1933, pp.91-94) - meeting an appointment (practical deliberation), a pole projecting from a ferry (reflection on an observation), and the movement of soapsud bubbles (reflection involving experiment) - is a situation that is not intrinsically time-bound. Dewey refers to reflection as anticipation, for example in the act of planting seeds (1933, p.18), and notes that “it has been suggested that reflective thinking involves a look into the future, a forecast, an anticipation, or a prediction and that this should be listed as a sixth aspect or phase” (1933, p.117).

Haroutunian-Gordon (1994) points out that, for Dewey, “reflective thinking, or ‘thinking’ as he understood the term involved discovering what is already there but previously unrecognized.” Comparing Dewey’s concept of thinking with those of Wittgenstein and (in particular) Gadamer, she suggests that the outcome of thinking (referring to a process that others label reflection) can be the creation rather than the discovery of meaning, particularly through conversation. This also amounts to a future-oriented view of reflection.

Senge et al. (2005, p.86) also support the concept of reflection on the future: “From John Dewey on, theorists have argued that we learn from the past through cycles of action and reflection that lead to new actions. But [Brian] Arthur was pointing to a different type of learning process where we learn instead from a future that has not yet happened and from continually discovering our part in bringing that future to pass.” This view specifically incorporates the role of the reflector in creating the anticipated future – which in the reflection-as-comparison model takes the form of varying the three parameters, as explained below under the heading of “Tightening the triangle.”

Boud, Keogh, and Walker (1985, p.9) take the view that reflection occurs in three stages: before, during, and after an expected experience. Loughran (1996) makes a similar argument, distinguishing between anticipatory, contemporaneous, and retrospective reflection. Reflection-before and anticipatory reflection are both forms of reflection on the future. Likewise, Schön (1983) distinguishes between “reflection in action” (reflection concurrent with action) and “reflection on action” (reflection following the action). Extending the stages of Boud, Keogh, and Walker (1985) one might add “reflection for action” (reflection in anticipation of action).

For some types of professionals studied by Schön, such as medical practitioners, it is reasonable to argue that reflection on the future may no different from reflection on the past. This is the future as habit, described in the previous section. In repetitive professional work, the medical practitioners of whom Schön writes might experience a Deweyan perplexity related to the treatment of a particular patient, reflect on that, and apply the solution found to the next relevant instance of that ailment. However other types of professional practice may not be able to translate learning about past cases directly into the application of future cases.

A clear instance of a very different type of professional practice is information systems consultation, in which neither consultant nor clients may never have encountered a particular perplexity before, because IS applications tend to be expensive and long-
lasting. Even if an application is not the client organization’s first exercise of that type, after the typical lapse of a decade or so, it is likely that the no individuals who dealt with the previous development may still be employed by either firm. Thus for all involved, the development of a particular application may be the first example of its type. Reflection on this opens up many possibilities, as represented in the diverging lines on the right of Figure 2: this is true “reflection on the future.”

The reflection-as-comparison model has no inherent limitations on reflection on the future. When reflection is on the past or on the present (Schön’s reflection-on-action or reflection-in-action), the “standard situation” can be a previous situation, or a counterfactual in the traditional sense. When habit or cyclical patterns are involved, the future is effectively the same as the past, so reflection on that type of future is equivalent to reflection on the past.

However, if the topic of reflection is a situation not previously experienced, the “standard situation” is unpredictable, and reflection on multiple possibilities is useful. A useful notion here is the concept of counterfactuality. As used by leading writers on this subject (Lewis 1973, Roese 1997, Ferguson 1999) it refers to alternative possibilities for the past, branching out to alternative presents. In the sense of Dewey’s third stage of reflection, “counterfactual” has the same meaning, but transfers the branching point from the past to the present. In the language of futurists, such counterfactuals are labelled as images or visions of the future (Nanus 1992). When multiple standard situations are envisaged, they amount to scenarios of the future, as described by futurists such as Ringland (1998) and van der Heijden (1996). Other recent writers on futures studies, though not using the term “reflection,” have developed approaches that use reflective processes to question the future. These include the “integral futures” of Slaughter (2003, chapter 11) and the Causal Layered Analysis of Inayatullah (2004).

**Tightening the triangle**

A practical application of the reflection-as-comparison model, when one is faced with a difficult problem, is to explicitly vary each of the three aspects of the reflective triangle. This could be labelled “triangle tightening,” and would proceed as follows:

1. How might I reperceive the current situation, by varying the input filter? (In practice, “how” is often translated into “from whose viewpoint.”)

2. If no standard situation seems relevant, change whatever output filter I might be using. (A well-informed person from a different background might see my filters more clearly than I do; I would be foolish to ignore such perceptions.)

3. How can the reperceived current situation and standard situation be brought into alignment? (If the standard situation is a desired one, this will involved changing the current situation, which in this context will be a “problem.”)

4. Continue adjusting all three elements until there is some resolution. This resolution need not be “solving the problem” - it may, for example, produce a division into several different problems, or an answer to a question that initially seems entirely different.

These steps sound straightforward, but it is not easy to detect one’s own assumptions: not without comparing them with the assumptions of others, and remaining open to other interpretations - the difficulties of which were noted by Argyris (1991). For that reason, effective use of reflection-as-comparison requires exposure of the model to a wide range of stakeholders, as demonstrated by the following case study.

**A case study of reflecting on the future**

As an example of reflection-as-comparison applied to the uncertain future, the author and a colleague recently won a consultancy project advising on the feasibility of an online community information system. This example will be used as a case study, not because it was a groundbreaking project conceptually, but because it is a clear example of the need to reflect on the future, and of how reflection-as-comparison was used for this purpose.

The project involved a feasibility study and strategic plan for a group of five shires (local government areas) in western Victoria,
Australia. For the past ten years or so, the shires had co-operated in maintaining a database of non-profit community organizations in the area. The five shires have a combined population of around 50,000 people, in an area approximately 200km square: about the size of Belgium or Taiwan. The largest town has a population approaching 20,000, including outlying areas, while four other towns have populations between 3,000 and 10,000. Most of the other residents live or work in very small towns, or on farms.

The existing database of community organizations contained details of some 3,000 nonprofit organizations and their offices: one for every 17 people in the region. This ratio seemed so high that we at first suspected an error, but later verified it. The database was held on a PC at a Citizen’s Advice Bureau of the largest shire council, with copies on one other PC at the council offices. A separate software licence was needed for each instance of the database. The software was proprietary, written by a Victorian company. Available statistics, though several years out of date, showed that around 50% of households in the region had internet access: one of the lowest penetration levels in Victoria. We estimated that around 60% of households had internet access, at the time of the study in mid-2005.

The focus of the project was to advise whether it was worthwhile to place this database on the Web, so that it could be accessed by everybody - and if so, how this could best be accomplished. There would obviously be both a substantial one-off cost and small continuing costs to maintain the database in Web format, but these costs would be offset by the advantages of greater accessibility. One factor was the state government’s policy that Melbourne, the capital of Victoria, was becoming too large and there was thus a need to decentralize the population. The region of this study was the only part of Victoria where the population had declined between the two previous censuses. Therefore an online database demonstrating the number and strength of community organizations in this region could be a factor in persuading people to move there from Melbourne.

One factor to be taken into account was the existence of several community directory websites that were obviously unsuccessful: they were clearly incomplete and/or rarely visited. It was obvious that without attaining certain minimal thresholds of comprehensiveness and user numbers, putting the existing database online would not be worthwhile. The size of those thresholds, however, was unknown.

Method

The study began by searching the Web for examples of successful publicly-run community database in areas with similar population sizes, densities, and levels of internet access. We found nothing directly comparable, except in communities with a much larger population in a much smaller area. Given that situation, here was a clear example of the need to reflect on the future, without the availability of data from the past.

Four aspects of feasibility were involved:

(a) how difficult, expensive, and/or time consuming it would be to transfer the existing database to online format;

(b) whether the funds required to operate and maintain a website of the appropriate scale would match the value that users would obtain from it;

(c) the mixture of where such funds could be obtained;

(d) to what extent the needs of potential users matched the data available, and the projected online format.

The project team attempted to find a combination of characteristics of an information system that would satisfy as many stakeholders as possible, and be sustainable in terms of both funding and human involvement.

Though the project specifications did not require interviewing stakeholders, we suspected that some of our clients may have been making unwarranted assumptions about potential users. We therefore set up a small research program, and encouraged the clients to participate actively. Four stakeholder groups were initially defined: information suppliers (such as community organizations),
information users (such as the general public), resource suppliers (such as shire councils and software suppliers), and competitors (other providers of community information to local publics). By speaking to each of these, we hoped to be able to detect any assumptional filters which they - and we - were applying. Some 60 in-depth interviews were carried out for the project (Minichiello, Aroni, Timewell, and Alexander, 1995).

Interview sessions typically consisted a half-day of semi-structured interviews in a particular location. In each session, around four full interviews were conducted, mostly with two researchers present, and often with multiple respondents. One researcher asked questions while the other observed and made notes. The focus of each interview was the types of community-based information sought by the respondent, how those needs were currently fulfilled, and the respondent’s willingness to adopt an online system.

As most of the stakeholders interviewed were not well informed about the issues involved, the work turned out to involve a good deal of informal education. Because concepts needed to be explained in the interviews, the stakeholders interviewed immediately became atypical of the population they represented. Therefore this study could not be considered normal market research, in terms of drawing conclusions about a population, based on a random sample of that population. It was thus a form of action research, with each semi-structured interview becoming one reflection on the futures of the proposed online information system. The reflectors in this case were the members of the development team, not the respondents interviewed; the latter acted to flex the filters being used by the former.

Following each session of interviews, the ongoing process of reflection in step 3 was repeated: bringing into alignment the reperceived problem situation and the standard situation. The fieldwork situation was well suited to reflection. Because we had plenty of time (with the size of the region, travel times between most locations were several hours) we were able to reflect at some length. While driving from one location to the next, we would exchange reflections on the session just completed, compare it with previous sessions, and make notes on those findings. As our perceptions of the interviews varied, these discussions were often disputatious, exploring many arguments in detail until we had either reached consensus or clarified our disagreements.

It is relevant to note here that we were not consciously using the reflection-as-comparison model: we were simply reflecting on what form the information system might best take. This paper is not arguing that reflection-as-comparison is a procedure that can be consciously applied; rather that, when futures are reflected on, this model is being tacitly adopted.

The interviewing process extended over a month or so. Throughout this period, our concept of the system to be designed - the “standard situation” - steadily evolved. We gradually realized that our initial conception was a narrow one. In the end, rather than seeing the task as the design of an IT system, we came to see it as the design of a social system. Its components included a sustainable funding system, an information-updating system, and an awareness-generating system. The database system, the initial focus, though integral to the final design, turned out not to be a crucial component.

Comparison with reflective models

How does this case study compare with the two models of reflection presented above: Dewey’s five-phase model and the reflection-as-comparison model? In retrospect, Dewey’s model was applied to the case study, to see how it would compare with the reflection-as-comparison model. As it turned out, Dewey’s five-phase model could not readily be adapted to this study; the five phases simply did not correspond with the reflection process that took place. However, the reflection-as-comparison model proved to fit the situation well. In terms of the three-step model described in section 1.3 above, the reflection process for managing this case study consisted of:
### Table 1: Application of reflection-as-comparison model to the case study itself

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Description</th>
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<tbody>
<tr>
<td>1.</td>
<td>Perceives (through a filter)</td>
<td>A current situation, as problematic in some way.</td>
</tr>
<tr>
<td>2.</td>
<td>Perceives (also through a filter), a standard situation as comparison.</td>
<td>PC database accessible to few people, so little used.</td>
</tr>
<tr>
<td>3.</td>
<td>Considers what changes might be necessary to bring the two situations into alignment, by any or all of three methods:</td>
<td>An online database, accessible to all with internet access.</td>
</tr>
<tr>
<td>3a.</td>
<td>Re-perceiving the current situation, by varying its filter</td>
<td>Questioning the boundaries of &quot;community&quot; and “information” and interviewing a wide range of stakeholders</td>
</tr>
<tr>
<td>3b.</td>
<td>Changing the standard situation</td>
<td>Designing a sustainable social system centred around the online database</td>
</tr>
<tr>
<td>3c.</td>
<td>Reconfiguring the changes seen as needed to bring the two situations into closer alignment.</td>
<td>Creating a workable and economical plan for moving from the present system to the designed system.</td>
</tr>
</tbody>
</table>

The entries in the above table imply that the reflector is the system designer. Additional tables could be drawn up for other roles, particularly information providers and information users, as well as for information intermediaries and resource providers for the system. The main point to be drawn from the above table is that all three elements (the current situation, the standard situation, and the changes needed) were continuously modified as the interviews progressed, until researchers and clients were all convinced that the design for an online system was workable.

**CONCLUSION**

A key question that now arises is whether the above case was really an example of “reflecting on the future” or simply of planning a system - or, alternatively, could all planning be considered equivalent to reflecting on the future? This question may be answered by returning to Dewey. He states (1933, p.14) that “Thinking begins in what may fairly enough be called a forked-road situation, a situation that is ambiguous, that presents a dilemma, that proposes alternatives.” This suggests that planning does not constitute reflection on the future unless alternatives are considered. Also, as foreshadowed in the above discussion on filtering, reinforced by the observation of Alvesson and Skjöldberg (2000, p.247) that “reflection occurs when one mode of thought is confronted by another,” a second essential component of reflection on the future is the scrutiny of possible mental filters and assumptions that may impede clear-sighted views of potential futures. Lacking the latter component, reflection on the future could not move beyond reflection on habitual behaviour.

Nor can reflection on the future be considered as simply equivalent to reasoning about future action. The latter term implies a purely rational process, in which possibilities are evaluated in a purely cognitive fashion. But, as noted above, reflection involves an affective component, and this case study involved (on the client’s part) strongly held views about issues such as local control. This planning was not a purely rational process, but more one of feeling a way forward to a solution that we consultants believed would be viable and the clients and potential users would find acceptable in terms of their values.

What are the practical implications of reflection on the future for information systems practice? Though this paper is not primarily intended to be normative, the “triangle tightening” method described at the end of section 3 above, drawn from the reflection-as-comparison model, is one that, in a difficult situation, might usefully be worked through explicitly. As there are many ways of achieving such tightening, which would depend very much on a particular problem situation, there is no point in trying to formulate explicit procedures for each of the four stages involved.

In summary, this paper has attempted to demonstrate the feasibility of reflecting on the future. Though Dewey’s (1933) five-phase model of reflective thinking did not explicitly allow for reflection on the future, a close reading of *How We Think* found that Dewey’s concept of reflection did not preclude this.
Strangely, no more recent writing was found that directly addressed reflection on the future, so this paper appears to be the first explicit coverage of this concept.

No suggestion is implied here that the reflection-as-comparison model should replace Dewey’s five-phase model, or that either is prescriptive, urging that “this is how reflection should be done.” Nor could either model be empirically verified: mental processes move too fast and too spasmodically for that. Rather, each model is a lens that can be adapted to review and potentially improve a particular reflective process. When assumptional filters may impede reflection, or when the output is to be a normative course of action, the reflection-as-comparison model might be more useful; when studying “observational reflection” and “experimental reflection” in a scientific mode, as described by Dewey, his model would be more useful.

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