

PATENTS ACT 1977

APPLICANTS Benesse Corporation and Susumu
 Fujimori

ISSUE Whether patent application number GB
 0507837.3 complies with section 1(2)

HEARING OFFICER R C Kennell

DECISION

- 1 This application is directed to a system for evaluating tests such as achievement tests, psychological tests and clinical examinations. It was filed as international application no. PCT/JP2003/012252 on 25 September 2003, claiming a priority of 25 September 2002 from an earlier Japanese application, and published under no. WO2004/029906 on 8 April 2004. On entry to the UK national phase it was re-published under serial no. GB 2 409 314 A.

- 2 Despite amendment of the claims during substantive examination, the applicants have been unable to persuade the examiner that this is a patentable invention within the meaning of section 1(2) of the Act. This matter therefore came before me at a hearing on 15 March 2007. The applicants were represented by their patent attorney, Mr Alan MacDougall of Mathys & Squire, and the examiner, Mr Ben Widdows, also attended via videolink. Before the hearing Mr MacDougall provided a submission detailing his main arguments, which he took me through at the hearing.

The invention

- 3 As the introductory part of the specification explains, the invention is based on a theory known as “item response theory” which, unlike classical test theory, allows a uniform treatment of testees who take examinations consisting of different items, or at different times or places, to be treated in a unified manner. However, previous computer-based tests based on item response theory have not found it easy to handle tests such as essays and oral examinations which do not reduce to a correct/false answer to which binary values of 1 and 0 can be assigned; hitherto they have had to rely on “graded response” models which required significant processing power because of the complexity of the parameter

estimation that was involved. The invention provides a “partial score” model which simplifies the processing of questions which have to be marked as a partial score between 1 and 0.

- 4 The independent claims in their latest form comprise claims 1 and 16 to test systems, claim 6 to a method for controlling the test system and claim 11 to a test management server for the test system. Claims 1, 6 and 11 are directed to networked computer systems, but claim 16 reflects the possible use of the invention in a stand-alone personal computer having no communications capability (see page 35 line 8 – page 36 line 4). I recite claim 16 in the Annex to this decision; the other independent claims are characterized by the same processing algorithm.

The law and the Office’s practice

- 5 Section 1(2) reads (emphasis added):

“It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of –

(a) a discovery, scientific theory or **mathematical method**;

....;

(c) a scheme, rule or method for performing a mental act, playing a game or doing business, or **a program for a computer**;

....;

but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act **only to the extent that a patent or application for a patent relates to that thing as such.**”

- 6 On 27 October 2006, the Court of Appeal delivered its judgment in the matters of *Aerotel Ltd v Telco Holdings Ltd* and *Macrossan’s Application* [2006] EWCA Civ 1371, [2007] RPC 7 (hereinafter “*Aerotel/Macrossan*”). In this case the court reviewed the case law on the interpretation of section 1(2) and approved a new four-step test for the assessment of patentability, namely:

- 1) Properly construe the claim
- 2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution)
- 3) Ask whether it falls solely within the excluded matter
- 4) Check whether the actual or alleged contribution is actually technical in nature.

- 7 In a notice published on 2 November 2006¹, the Office stated that this test would be applied by examiners with immediate effect. It did not expect that this would fundamentally change the boundary between what was and was not patentable in the UK, except possibly for the odd borderline case. Although the approach

¹ <http://www.patent.gov.uk/patent/p-decisionmaking/p-law/p-law-notice/p-law-notice-subjectmatter.htm>

differs from that currently adopted by the European Patent Office in *Hitachi* (T 0258/03), it was expected that the result would be the same in nearly every case. The dispute in this case turns on paragraph 10 of the notice, which states:

“If the invention passes the third step, one must then check whether the contribution is technical in nature. Of course it is not necessary to apply this fourth step if the invention has failed at the third, and the Court effectively acknowledged this, although it chose to apply it anyway in *Macrossan*.”

Argument and analysis

General considerations

- 8 Mr MacDougall raised a number of general points concerning the application of the *Aerotel/Macrossan* test. I think it will be helpful for me to comment on two particular points before going on to apply the test in the particular circumstances of the case.

Identifying the contribution in the second step

- 9 Mr MacDougall felt that it was important not to confuse this with identifying the novel and inventive subject matter of the invention. He pointed me to paragraph 43 of *Aerotel/Macrossan* to show, that in order to identify the contribution it was necessary to ask what was the benefit or advantage of the invention when viewed as a whole. He also referred me to the decision in *Touch Clarity Limited* (BL O/198/06) where although the invention lay in new and inventive software, the comptroller had been prepared to allow claims to the use of this software for controlling a robot.
- 10 I agree with Mr MacDougall, and I believe that he draws the correct conclusion from the example of *Touch Clarity*. Although this case was decided before *Aerotel/Macrossan*, it is referred to in the assessment of cases appended to the above-mentioned Office notice as one which would likely have been decided the same way under the new test. It clearly illustrates the importance of correctly defining the contribution. In *Touch Clarity*, claims to a system and method for determining the next best action for an “operating system” (encompassing a number of possibilities) to take, based on the on the assessment of a number of possible actions, were characterized by the use of a new algorithm, and were disallowed as relating to a mathematical method or a computer program as such. However claims restricted to a robotic operating system (eg for controlling a robot vacuum cleaner) were allowed. The Office’s assessment drew a distinction between a contribution which was a better way of determining what next action an operating system should take and one which was a better way of determining what next action a robot should take.

Whether the fourth step must be undertaken if the third step is failed

- 11 Mr MacDougall thought that the paragraph 10 of the Office’s notice quoted above was an incorrect interpretation of what the Court of Appeal had actually said in paragraph 46 of *Aerotel/Macrossan*. He contrasted what he saw as the “woolly

and uncertain” nature of the first sentence of the paragraph

“The fourth step – check whether the contribution is “technical” – may not be necessary because the third step should have covered that.”

with the “absolutely explicit and absolutely categorical” wording of the second sentence

“It is a necessary check however if one is to follow *Merrill Lynch*.² as we must.”

from which he deduced that the fourth step could never be avoided unless it had already been considered in the previous steps.

- 12 I do not agree. Paragraphs 41, 45 - 47 and 84 - 85 of *Aerotel/Macrossan* make it clear that the new test is a re-formulation of that in *Merrill Lynch* and *Fujitsu*.³, *Merrill Lynch* emphasising that inventive excluded matter could not count as a technical contribution. I think it is clear from paragraph 47 (emphasis added):

“As we have said this test is a re-formulation of the approach adopted by this court in *Fujitsu*: it asks the same questions but in a different order. *Fujitsu* asks first whether there is a technical contribution (which involves two questions: what is the contribution? is it technical?) and then added the rider **that a contribution which consists solely of excluded matter will not count as a technical contribution.**”

that if the contribution does not pass the third step that is an end of the matter and there is no need to go on to the fourth step (even if the Court chose to do so in the *Macrossan* appeal) save as a subsidiary check that a contribution which clears the third step is in fact technical in nature. I observe that in the recent judgment in *Cappellini’s Application and Bloomberg LP’s Application* [2007] EWHC 476 (Pat), which I drew to Mr MacDougall’s attention at the hearing, Pumfrey J regarded paragraph 47 as providing an important, but equally binding gloss, on *Fujitsu*. It is equally binding on me and I think its meaning is quite clear.

- 13 I do not therefore think it is a correct approach simply to assume that the earlier Court of Appeal decisions such as *Merrill Lynch* and *Gale*.⁴ continue absolutely unaffected by *Aerotel/Macrossan*, which appeared to be the basis on which Mr MacDougall argued the third step. In particular I think I should treat with considerable caution the proposition advanced by Mr MacDougall on the basis of *Merrill Lynch* and *Vicom* that if a computer system had been running an old program which was operating at one speed and was then loaded with a new and better program operating at a faster speed then there was something patentable. Mr MacDougall’s argument was based on the finding in *Merrill Lynch* that, on the authority of the EPO Board of Appeal decision in *Vicom* (T 208/84), a substantial increase in processing speed of the computer made a technical contribution to the art. I questioned whether that was in fact the conclusion to be drawn from *Vicom* in view of the comments in *Fujitsu* (see page 615 line 49 – page 616 line 11), but Mr MacDougall thought this comment was *obiter* and could not subtract

² *Merrill Lynch’s Application* [1989] RPC 561

³ *Fujitsu Ltd’s Application* [1997] RPC 608

⁴ *Gale’s Application* [1991] RPC 305

from the clear wording of *Merrill Lynch*. I do not think that I need to decide this point, but I think that the persuasive effect of *Vicom* must now be limited in view of the contradictions in the Boards' decisions highlighted by the Court of Appeal in *Aerotel/Macrossan* and its express refusal to follow EPO practice.

- 14 I believe that in a case such as Mr MacDougall mentions, *Aerotel/Macrossan* is quite clear as to the question which I must answer – does the contribution lie solely in excluded matter (in this case a new program or a mathematical method)? It seems to me that if it does, then the invention is excluded; however, if the contribution includes something of a technical nature in addition to the program, as I think would be the case in the case of the claims which were allowed in *Touch Clarity*, then the invention would not be excluded so long as the claims properly reflected the full contribution.

The present case

First step

- 15 I can now turn to the application of the test in the present case. The first step, the construction of the claims, is not in dispute and I do not think that it poses any difficulty.

Second step

- 16 The examiner considers the contribution of the invention to lie in perfecting the assessment of the testee by means of a “partial score” model. This is part of the story, but, as I have explained above, I think I need to look at this in the rather wider sense urged by Mr MacDougall. As he pointed out, prior art systems involving partial scores had relied on a “graded response” method with the disadvantages that I have mentioned above; the model of the invention was simpler, requiring less memory and less processing burden. I agree that this forms part of the identification of the contribution and I would therefore regard the contribution as the use of the partial score model to provide a simpler algorithm for the assessment of partial test scores, requiring less memory and consequently imposing a lower processing burden.

Third step

- 17 As I have explained above, I believe the third step of the test requires me to ask whether the contribution resides solely in excluded matter, in this case a computer program or a mathematical method. As is clear from paragraph 43 of *Aerotel/Macrossan*, I need to consider this as a matter of substance rather than the particular form of the claims.

Computer program

- 18 It seems to me that, irrespective of whether the invention is claimed as a test system, a method for controlling the test system or a test management server for the test system, the contribution of the invention is in substance a set of instructions for a networked computer system or a stand-alone personal

computer, whose hardware in either case is entirely conventional, to select problems from a database, present them to a testee and estimate the ability of the testee in the light of his or her responses. (Claim 16 makes no mention of a computer as such, but it has not been argued, and I do not think it is realistic to suppose, that the invention could be carried out other than by means of a computer.) In my view these instructions constitute a program for a computer.

- 19 The contribution will of course fail the third step only if it relates solely to excluded matter. I accept that the invention has the advantage that less memory is required and that the processing is quicker as a result. However, notwithstanding Mr MacDougall's argument on the basis of *Merrill Lynch*, I do not think that the increase in processing speed is sufficient to take the invention outside of excluded matter. In my view the increase in processing speed arises solely because a program has been devised which requires the computer to do less work, not because of any improvement to the operation of the computer itself. The advantages of the invention would seem to me to be realised wholly in the program.
- 20 Mr MacDougall also argued that in view of his identification of the contribution (with which I agree), that contribution was in the field of test systems and methods and not computer programs or mathematical methods as such. I do not think this analysis is correct. It seems to me what has been devised is a computer program which is intended for use in a testing system or method, and that (to use the language of paragraph 73 of *Aerotel/Macrossan*) there is no contribution beyond that program up and running. I do not think that the use of the program in testing systems takes it outside the exclusion, and more than did the use of the program for creating company documents in the *Macrossan* appeal.

Mathematical method

- 21 On the authority of *Gale*, Mr MacDougall argued that the application of the mathematical formula in the writing of computer instructions was sufficient to dispose of the objection that the contribution related to a mathematical method as such (see Nicholls LJ at page 327 lines 40 – 42). However, it seems to me that the question before the Court of Appeal in *Gale* was whether the invention related to a program for a computer and the comment to which Mr MacDougall refers is *obiter*; this would seem to be borne out by paragraph 92 of *Aerotel/Macrossan*. Further, I observe that in *Gale* Parker LJ merely stated that Mr Gale was not claiming protection for the new mathematical method that he had discovered and Sir Nicholas Browne-Wilkinson VC thought the invention was either a mathematical method or a computer program.
- 22 I do not therefore see anything in *Gale* which compels me to find that because a mathematical method is used for writing computer instructions it cannot relate to a mathematical method as such. As I mentioned at the hearing, that may well be a pointer against such a finding, but in the end it must come down to what the contribution of the invention is as a matter of substance. It accordingly seems to me that the contribution is at bottom a mathematical operation, characterized by a new algorithm, for estimating the ability of a testee on the basis of the pre-

assigned parameters of the set problems and the scores obtained.

- 23 In my view, therefore the contribution of the invention relates solely to a program for a computer and/or to a mathematical method.

Fourth step and other matters

- 24 I do not therefore think that it is necessary for me to go on to consider whether the contribution is technical in nature. Mr MacDougall argued that the increased speed of processing and lower memory requirement of the partial score model in relation to the graded score model were technical advantages. However, as I have explained above, these advantages arise in my view wholly from the way in which the computer has been programmed rather than because it is operating in a new technical manner.

- 25 Mr MacDougall argued that it would be illogical to exclude the invention when it was common in fields such as speech recognition and image processing for patents to be granted for improvements to the processing algorithms in order to improve the accuracy of the results or to speed up processing. He illustrated his point by reference to two patents granted by the Office (GB 2355835 and GB 2351577). However, as I emphasised at the hearing, each case has to be decided on its own merits and that is the approach I have taken above. Although I have carefully considered the prosecution history of these two patents, I do not see anything in them to persuade me that my reasoning is incorrect, particularly as regards the analogy with the Macrossan appeal (see paragraph 20 above).

Conclusion

- 26 I therefore conclude that the invention is excluded under section 1(2) because it relates to a program for a computer as such and/or to a mathematical method as such. Having read the specification, I do not think that any saving amendment is possible and I therefore refuse the application under section 18(3).

Appeal

- 27 Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

R C KENNEL

Deputy Director acting for the Comptroller

ANNEX TO DECISION O/117/07

Claim 16 as amended

A test system comprising:

a problem database for storing a plurality of problems each of which is assigned pre-estimated item parameters including a difficulty level and an identifiability of the problem;

means for presenting n problems to one testee so as to estimate the ability θ of the testee from his/her responses to the problems;

means, responsive to a request for selecting from the problem database n problems to be marked in such a manner that allows a partial score r_j to be given to the testee's response to a problem j, wherein $0 \leq r_j \leq 1$ with 1 being a full mark and $1 \leq j \leq n$;

answer storage means for storing an answer, responsive to each of the problems selected from the problem database;

means responsive to a request for reading answers stored in the answer storage means;

partial score storage means for receiving a partial score r_j assigned to the testee's answer and for storing the partial score r_j ; and

ability estimation means for estimating the ability θ of the testee who acquires the partial score r_j on the basis of the partial score r_j stored in the partial score storage means and the item parameters of the problem j stored in the problem database; and

wherein, in the ability estimation means, the partial score r_j is treated as an average value of true-false responses which the testee latently indicates to latent problems to which the testee latently indicates the correct response of 1 or the wrong response of 0 and that are repeatedly performed s_j times, and when $P_j(\theta)$ is the probability that the testee can correctly answer the latent problem and when $Q_j(\theta)$ is $1 - P_j(\theta)$, the ability θ of the testee is estimated using the logarithmic likelihood $l_{\text{part}}(\theta)$ represented by the following equation:

$$l_{\text{part}}(\theta) = \sum_{j=1}^n s_j (r_j \ln(P_j(\theta)) + (1-r_j) \ln(Q_j(\theta)))$$

R C KENNEL

30 April 2007