13 *Negotiation in learning*

Maureen Pope, Institute for Educational Technology, University of Surrey, Guildford, UK
Mildred Shaw, Middlesex Polytechnic at Trent Park, Barnet, UK

In a recent discussion on education technology Elton (1977) reviewed developments within education technology and suggested that, at least within higher education, there has been a change of emphasis in terms of the methods and means of teaching from mass instruction via individualised instruction to group learning. He suggests that a reason for this shift in emphasis parallels development within education in general, which tends to follow the three stages of dependence, independence and interdependence. Elton suggests that the three stages are reflected in the three types of instruction. In mass instruction the student is seen as *dependent* upon the teacher for the content and form of the learning that takes place. The development of sophisticated audiovisual aids such as closed circuit television has provided a resource which facilitates mass instruction and dependence. Programmed learning and the Keller Plan (Keller, 1968) provide resources which were designed to promote individualised instruction and a degree of independence. However, Elton suggests that since we are surrounded by people, 'The truly developed individual is interdependent'. He suggests that it is not until learners work in groups that they become interdependent and suggests that 'there is a *natural* progression in education in this direction'.

In this chapter we shall discuss two computer programs, PEGASUS and SOCIOGRIDS, which are useful resource tools suitable for a variety of learning contexts but with particular emphasis upon independent and interdependent learning situations. These programs have their roots within personal construct psychology, the basic tenets of which would seem to be consistent with current developments within education. Whether or not there is a 'natural progression' from mass to individual to group emphasis within education (Elton, 1977) is debatable but that there has been a paradigm shift would seem obvious. At this point it might be useful to highlight something of this shift and provide an ideological context within which PEGASUS and SOCIOGRIDS can be viewed.

Traditionally the educator's job was seen to be the direct instruction of information and rules, and education was seen as the transmission of the culturally given. For example, Robert Maynard Hutchins (1936, page 66) wrote: 'Education implies teaching. Teaching implies knowledge. Knowledge is truth. The truth is everywhere the same. Hence, education should be everywhere the same.'

Much of the basis of educational technology and behavioural modification approaches to education can be seen as variants of this cultural transmission approach. Knowledge and values are seen as located in the culture and are internalised by children imitating adult behaviour models or through explicit instruction

and the use of such training procedures as reward and punishment. The criterion of successful education for such theorists is the student's ability to incorporate the responses he has been taught and to respond to the demands of the system.

Skinner (1968) views teachers as architects and builders of student behaviour. He defines learning as a change in the probability of response. He seeks to explain all human behaviour in terms of respondents' operant reinforcement. Through progressively changing the contingencies of reinforcement in the direction of the desired behaviour (as defined by the teacher) learning is seen to occur. Educational change is evaluated from *performances*, not from *changes in thoughts or feelings*. Traditional teaching methods are often referred to as 'expository presentation' or 'receptive' learning methods which emphasise the student's role as the passive receiver of information rather than the active participant. The dominant idea was that students do not have sufficient self-direction to work out educational programmes in collaboration with their teachers; thus, the students have little or no control over the manner in which they are taught and curriculum content. Indeed, many educators assumed that the learner is naturally lazy and must be prodded into action by external incentives as the following from Cox and Dyson (1969, page 56) indicates: 'Exams make people work hard. Much opposition to them is based on the belief that people work better without reward and incentive, a naivety which is against all knowledge of human nature.' Much of this view of learning corresponds to the Lockean assumption that the intellect is essentially passive and acquires its content and structure through the impact of sensation—the world we perceive is not a world that we have re-created mentally but the world as it is. The task of the school and college for the realist would seem to be the instruction of a body of knowledge whose truth has been repeatedly confirmed.

This view of teaching and learning has dominated western education and has been supported by psychological theories of development which stress the passivity of man's mind—associationism, behaviourism, stimulus–response psychology, contingency theories, etc. However, in the last few years we have seen a paradigm shift within psychology and education resulting in a renewed interest in the individual's *active* processing. Knowledge is seen as being produced by transaction between man and his environment and an emphasis is now placed upon an active man reaching out to make sense of his universe by engaging in the reconstruction and interpretation of his own experiences. Following in the traditions of Rousseau and Dewey, modern educationalists maintain that learning should be directly related to the interests of the person; motivation to learn should come from within the person rather than knowledge be imposed upon him. The teacher is seen more as a guide or adviser in a process whereby the person reconstructs the subject matter in accordance with its perceived relevance to his own life.

The teaching methods upheld by progressivism encourage student–student interaction as well as student–teacher interaction. The teacher is interested in students developing their own criteria regarding the quality and relevance of ideas, and he allows this to develop by minimising his role as an arbiter of what is acceptable. His aim is not the transmission of factual knowledge; rather he aims to facilitate the process of learning and the acquisition of personal potency (Brown, 1971).

The following quotation (Postman and Weingartner, 1971, page 59) reflects educationalists' concern with the active involvement of the learner:

'There is no way to help the learner to be disciplined, active and thoroughly engaged unless he perceives a problem to be a problem, or whatever is to be learned to be worth learning, and unless he plays an active role in determining the process of solution.'

'How to learn is in itself something that has to be learned, though is rarely "taught" in traditional schools. . . . The development of learning competence enables the child to become an active determiner of his own destiny and gives him the fundamental power of extending and releasing all other potentialities' (Jordan, 1973, page 87). Kelly (1970, page 262) recognised learning as a personal exploration and saw the teacher's role as helping 'to design and implement each child's own undertakings. . . To become a fully accredited participant in the experimental enterprise she must gain some sense of what is being seen through the child's eyes.'

What is relevant to the person is of importance and for education to be a joint venture between teacher and learner it is essential that each has some awareness of the other's personal constructs.

The perspective of the student as well as that of the teacher must be considered, although traditionally learning has been defined mainly from the latter's perspective. Jahoda and Thomas (1965) outlined four different perspectives from which the learning experience can be viewed (see table 13.1).

Table 13.1 Perspectives on learning

Purpose	Learner	Teacher
Prospective	1	2
Retrospective	3	4

Each of the four quadrants in table 13.1 represents a different and valid point of view: quadrant 1 represents the learner's anticipation of the event; quadrant 2 represents the teacher's objectives; quadrants 3 and 4 denote a retrospective view of the experience from the perspective of the learner and the teacher, respectively. Kelly (1969, page 135) maintained that 'humanistic psychology needs a technology through which to express its humane intentions. Humanity needs to be implemented not merely characterised and eulogised.' Humanistic psychologists and educators must develop technologies appropriate to their orientation–that is, tools which help in the articulation of personal perspectives.

We would suggest that PEGASUS and SOCIOGRIDS represent tools which meet this purpose.

The computer program PEGASUS was developed by Shaw and Thomas (1978) as an extension of the normal clinical method of grid elicitation. Using real-time data processing, the individual is provided with an ongoing analysis of the links being made between constructs and between elements as the grid is elicited. This ongoing feedback enables the learner to examine and bring into awareness his own conceptual system with respect to an area under investigation. It offers learners a choice of continuing reflection by adding new elements or constructs and the ability to push themselves into further differentation between elements or con-

structs which have proved to be highly matched. By providing an analysis of the results immediately on completion the computer acts as a cognitive mirror in which the user sees himself. The student is free either to reflect on the outcome on his own or to discuss the experience and printout with a tutor or fellow student.

One of the main advantages of the PEGASUS program is that it is content-free; any topic may be used as a basis for the interaction. School children, university students, housewives, lecturers and managers have all used the program to construe a variety of elements related to a wide variety of purposes. Examples of these have been significant learning events, audiovisual equipment, architectural styles, examination scripts, prospective careers, mathematical concepts and books.

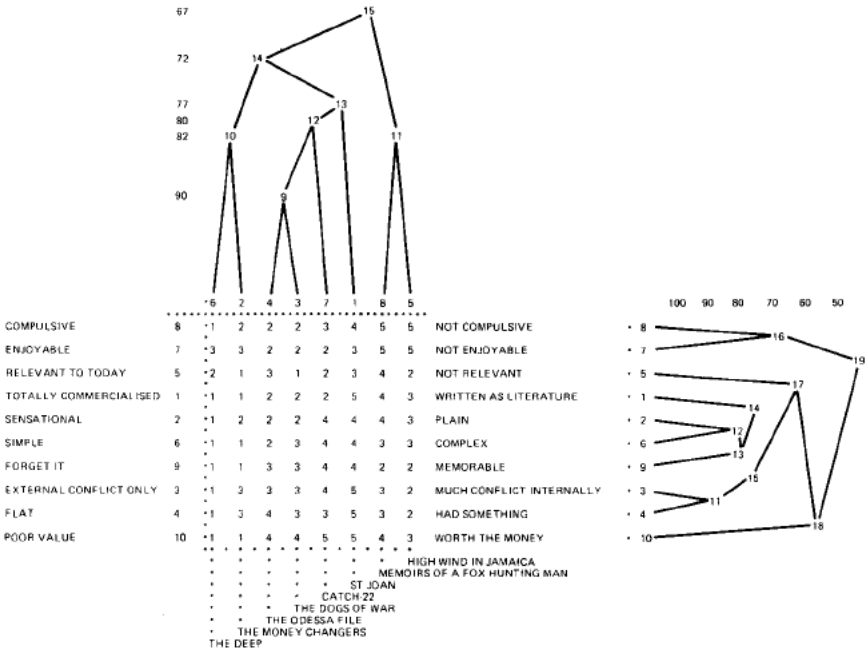

Figure 13.1 Focus grid on books

Figure 13.1 illustrates a FOCUSed grid which is available at the end of a PEGASUS run. The 14-year-old student who produced this grid defined his purpose for using PEGASUS as a resource as helping him 'to distinguish between the books I have recently read'. In the initial stages of the interaction this student used the constructs totally commercialised-written as literature and sensational-plain with a high degree of match. The computer provided feedback concerning this match and encouraged the student to add an element which 'is either totally commercialised and plain *or* sensational and written as literature'. The student opted to add the element Catch-22. The feedback given by the computer also points out matching or similar use of elements and gives opportunities to act on the information given at each stage. Very little structure is imposed on the user and a variety of choice is given wherever possible, thus allowing the learner to choose the level and direction of reflection on his ideas.

The following quotation from a PEGASUS user (a teacher) is typical of the reaction the authors have found when discussing the program with users. It indicates that the program facilitates personal exploration which is valued. 'It caused me to think about what I might be here for. What I think teaching is about. It was a good opportunity to sort my ideas out–you are questioning yourself on things that you are concerned with and not someone else's questions–I like that.'

It is of course necessary for the learner to relate his construction of personally relevant meaning to bodies of established knowledge and traditional educational disciplines. A careful course must be charted between the Scylla of unquestioned dogma and 'facts', and the Charybdis of confusion and avoiding the wisdom of past generations. PEGASUS-BANK is a development of PEGASUS which allows the user to complete a grid on a topic area and get ongoing feedback on the relationships between his constructs and those of 'an expert' or the consensually validated definitions which represent public knowledge in the area (Shaw, 1980a). We have found that if a tutor and student complete grids on the same topic area, this provides a useful basis for discussion. Externalising areas of similarity and dissimilarity between a tutor's grid and that of the student gives a framework for negotiation of differences between tutor's and student's perspectives. This leads to a greater awareness and understanding of the other's point of view. If the technique of grid-elicitation together with grid-feedback is used in a 'learning-centred' way, personal models can be brought into awareness, revised and refined, or even rebuilt to enable learning to be more successful in those areas where inadequate modelling was hindering the learning process.

The SOCIOGRIDS program was devised in order to explore the similarity and differences in construing between members of a group. This technique is based on an assumption rooted in Kelly's Commonality Corollary that there may be areas of shared meaning among any group of individuals. Starting with the negotiation of a common set of elements by the group concerned, this program analyses the set of repertory grids elicited from the group. Each person is free to use his/her own personal constructs. Similarity between constructs is not based upon literal similarity but upon an operational definition of similarity in terms of the ordering of the element set (Shaw, (1979).

Using the SOCIOGRIDS technique, each individual in the group can have feedback on his own mapping of the area from a FOCUSed grid (as in figure 13.1). In addition, a 'mode' grid of the most commonly used constructs by all the members of the group is extracted and focused, exhibiting the content of the shared construing in the group. Each construct in the mode grid has been obtained from an individual in the group and is in no way changed when used in the mode. This grid, then, is not one which averages out the individualities to produce a pale imitation of the group, but is strongly weighted towards the commonality of construing within the group. Owing to this, the constructs tend to be highly clustered in a mode grid, and in general, these clusters display a high degree of both literal and conceptual similarity in the construct labels as denoted by Duck (1973).

Figure 13.2 illustrates a mode grid from a group of trainers who were concerned with identifying their ideas about tools for evaluating performance at work. Thus, the elements were a common set of 'tools' chosen by the group and the constructs reflected their ideas in relation to the tools. One can see that there is a high degree of emphasis on constructs of the type quantitative-qualitative. One can also see that, for some people, slightly different meanings may be attri-

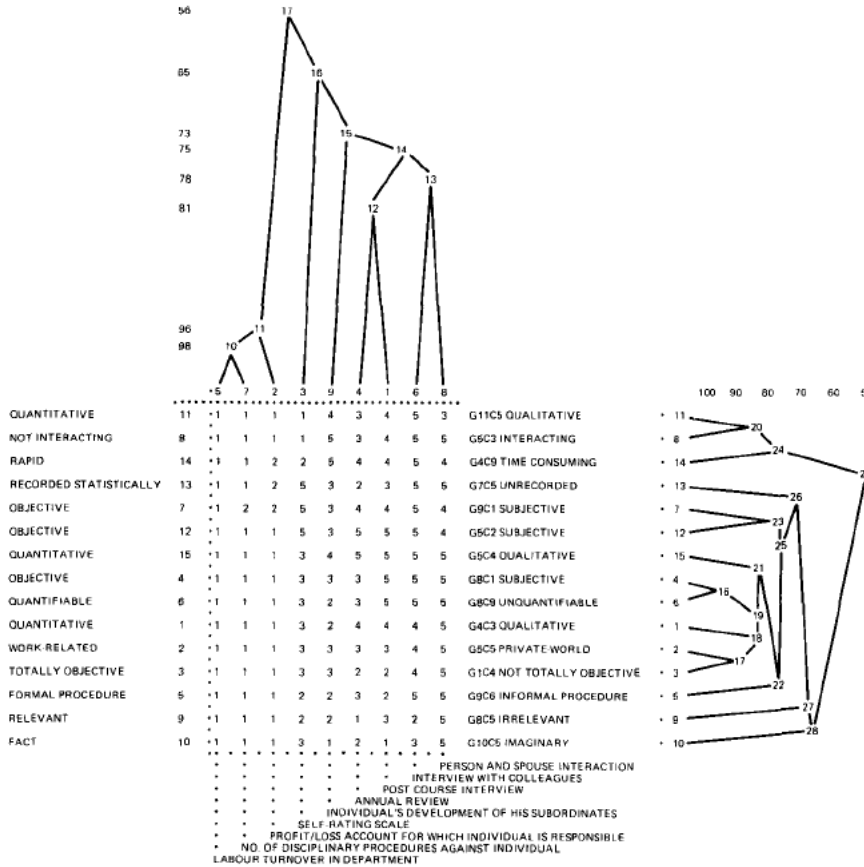

Figure 13.2 'Mode' from a group of trainers

buted to the *same* words (e.g. constructs 11, 15 and 1), while for others *different* words may be used to express the same underlying meaning. Reflection on such results facilitates negotiation of personal meaning and a deeper understanding of alternative perspectives.

The program also produces a sequence of 'socionets' from the matrix of similarity measures between pairs of individual grids. The highest related pair in a group can be extracted as a sub-group where the most commonality of construing occurs and subsequent individuals can be defined by their position in the rank-ordering of the similarity measures. Thus, this set of socionets exposes those members of the group who have most in common and those with strongly individualistic viewpoints.

Figure 13.3 illustrates a socionet diagram from a study carried out into subjective standards in the inspection of knitwear (Pope, Shaw and Thomas, 1977). The purposes of the study were to help each member of a group concerned with quality control to become more aware of his or her own personal dimensions for judging faults in garments and to explore the patterns of judgements within the group in order to discuss the similarities and differences that existed between individuals. The points of interest to note from this diagram are:

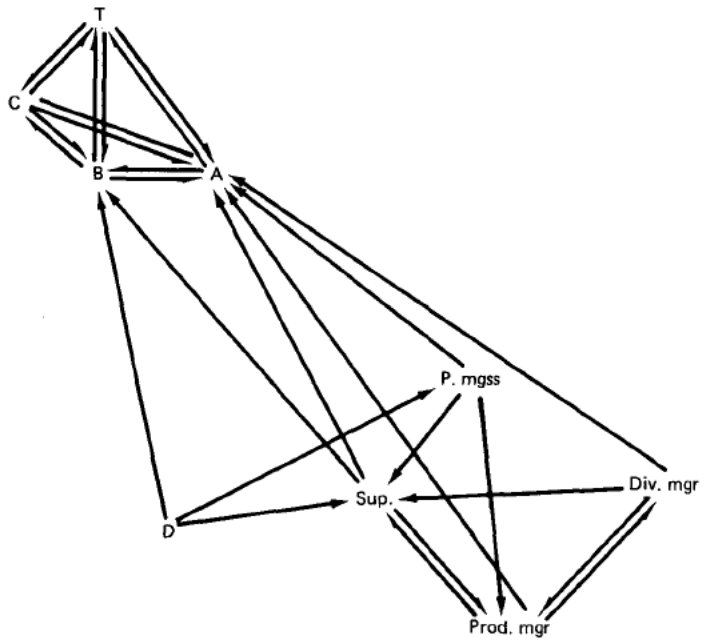

Figure 13.3 Diagram showing the systems of connections between participants (expressed as the three grids which were most like each person's own grid). A, B, C, D: Final inspectors. T: Trainee technologist. Sup.: Inspection supervisor. P. mgss: Production manageress. Prod. mgr: Production manager. Div. mgr: Divisional manager

(1) Three inspectors and a trainee production technologist shared similar views of faults.

(2) One of the inspectors seemed to differ from his group.

(3) The supervisory and management group shared similar views of faults, although the similarity is less strong and it differs from that of the inspectors.

(4) The patterns of reciprocal similarities—i.e. among inspector and trainee, between supervisor and production manager and divisional manager.

(5) Each of the supervisory/management group related to inspector A.

These results highlighted the fact that different roles within the company incorporated different viewpoints of quality, and provided a foundation for the negotiation and exchange of meaning. Having had feedback using the 'mode' grid and the socionets, the individual can refer to his own set of constructs and discuss these with other members of the group.

It may seem that this industrial example is totally removed from educational practice. However, the techniques developed through such action research are useful resources for the education researcher and teachers and students in the classroom. They have been used to help teachers reflect on their ideas about teaching (Pope, 1978), and Pope and Gilbert are investigating the technique as

applied to students' and teachers' constructions in the area of environmental science following Gilbert's (1979) work in this field.

Both SOCIOGRIDS and PEGASUS are based on the FOCUS algorithm. This is a two-way cluster analytic technique designed to re-order the rows of constructs and columns of elements in such a way as to make adjacent lines most alike in the pattern of ratings. An example is shown in figure 13.2. This method was developed in preference to factor analysis, principal components analysis and multidimensional scaling, all of which extract factors in different ways. (For further discussion see Shaw 1980b.) The criteria for its development were that the analysis should *simplify* the data while still exhibiting the original scores; that the results of the analysis should be *clearly displayed* rather than hidden in mathematical complexity; and that the form of the results should aid the *subject* in giving *meaning* to the relationships implicit in the data.

The SOCIOGRIDS method represents a technological advance which allows the learner to reflect on his personal model while offering each member of the group the facility to become aware of the interrelationships between ideas within the group. It is a powerful technique appropriate for interdependent learning situations. It has been our experience that learners become very involved in the process of reviewing similarities and negotiating the differences within the group and find it a relevant learning experience. In some cases it has been the first time the person has dwelt upon the notion of relativity in constructions of reality.

Esland (1971) suggested that, in education, knowledge itself must be dereified. The SOCIOGRIDS program certainly helps this process of dereification. Esland (page 96) noted that, once dereified, knowledge then becomes

> '. . . a much more negotiable commodity between teacher and pupil. Its social-historic relativity is likely to be transparent and the content of knowledge may become subservient to the development of a cognitive technology which is capable of projecting multiple inferential structures containing both enactive and theoretical knowledge.'

Esland suggested that new configurations of knowledge arise from questioning in learning situations and that boundaries between 'subjects' are 'only human constructs and can, therefore, be broken'.

PEGASUS and SOCIOGRIDS offer teachers and learners a resource which encourages the individual to reflect on his conceptualisations of his world and an opportunity to explore differing conceptions. Active involvement with his own and others' ideas may encourage the learner to see himself as a more potent force in the determination of his own learning and in the development of new knowledge. The form and content of education can be negotiated; PEGASUS and SOGIOGRIDS offer themselves as useful catalysts in this process of negotiation.

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