CHAPTER 2 - The Analysis of Economics Discourse by Economists and Applied Linguists: A review

2.0 Introduction

The overall aim of this chapter is to review the literature on the analysis of economics discourse by economists and applied linguists from two perspectives. The first is to ascertain the nature, the focus and the findings of the various studies, and the second is to review them in terms of their treatment, or perceived lack of treatment of visual modes of communication. The specific aim of this chapter is to show that despite an increasing awareness of the nature of economics discourse by both applied linguists and economists, the published research has not attempted or been able to in any significant way to describe, explain or account for the visual mode in economics discourse. The research by both economists and applied linguists is varied, but it tends to cover the full range of the available varieties of economics writing that are published within the field in both academically and commercially-oriented areas.

In recent years there has been a steady increase in interest and research into economics discourse by both economists and applied linguists which has spawned an expanding body of work. The nature of this work in part reflects not only the varied academic backgrounds of the writers, but also the evolutionary development of applied linguistics in general and its sub-discipline of discourse analysis in particular. This body of work is not only succeeding in clarifying many of the ways that economists use language to express themselves, but has also proven to be very useful for educators attempting to find solutions to the difficulties that students often have with the specialised language of economics at both the lexicogrammatical and discourse levels.

2.1 Analysis of Economics Discourse by Economists and Applied Linguists

Since the early 1980s, the discussion of various controversial issues in the economics discourse community has led to increasing debate among concerned economists about the ways that they communicate with each other, as well as with non-economists. This debate has been vigorous, and has also influenced the direction and nature of the research into economics discourse by applied linguists.

Before reviewing how visual communication is handled in the research on economics discourse, a brief exploration of these discussions by economists about their own discourse as well as an overview of the main areas of applied linguistic research would be instructive.

Economists' assessments of their own discourse has contributed to a growing awareness by many that the ways they communicate their ideas in economics do not accurately correspond to the ways they actually "do" economics. The major figure amongst those economists who advocate that fellow economists should examine the ways they use their own discourse is Donald McCloskey, an economic historian and economist, whose range of publications dealing with the "rhetoric of economics" (1983, 1984, 1986, 1990), has attracted academic interest from not only his economics colleagues, but also from applied linguists. McCloskey's thesis is to argue for a new methodology of economics. He asserts that economists have two attitudes to their discourse, termed the "official and unofficial, the explicit and implicit" (1986:5), and that the official, explicit attitude (and therefore rhetoric) reflects a scientific methodology which is "modernist", a modernism which consists of "an amalgam of logical positivism, behaviourism, operationalism, and the hypothetico-deductive model of science" (1983:484). McCloskey argues that economists in practice don't follow the rules as laid down by this official methodology (which he suggests may be a good thing), but in reality argue using the unofficial, implicit rhetoric of economics. He therefore believes that the rhetoric of economics should be examined by those economists who use it, suggesting that the quality of their argument would be at a more sophisticated level if they were more aware of the grounds on which they were arguing, because they:

> claim to be arguing on grounds of certain limited matters of statistical inference, on grounds of positive economics..... and other positivistic enthusiasms of the 1930's and 1940's. They believe that these are the only grounds for science. But in their actual scientific work they argue about the aptness of economic metaphors, the relevance of historical precedents, the persuasiveness of introspections, the power of authority, the charm of symmetry, the claims of morality (op.cit:482).

The responses to McCloskey's work have generally been quite positive (e.g. Button 1988; Pearce 1991:25), prompting even McCloskey himself to remark on their warmth (1984:579). Criticism of his ideas, however, has covered a range of areas, and it has varied in its intensity. Among economists who express strong reservations about, or directly oppose the usefulness or underlying assumptions of McCloskey's arguments, are Caldwell and Coats (1984:577). They agree with McCloskey's claim that positivism is dead, but disagree that it is the same situation with economic methodology. Others include Maki (1993), who refutes McCloskey's treatment of the nature of "Truth" in relation to a rhetoric of economics by distinguishing between two philosophies within that rhetoric, and Gerrard (1993), who suggests that hermeneutics can provide insights into the analysis of economics discourse.

Other economists besides McCloskey have also been actively examining aspects of economics discourse. Henderson (1986) for example, offers a seemingly parallel, but unconnected (there is no reference to McCloskey's work) examination of the various ways that metaphor in economics can be investigated, stating that they are very common both in economics as a science, and in discussions involving economic policy. Like McCloskey, he examines metaphor as a series of tropes (as in metaphor, simile, and analogy), and states that what he terms as "living" and "dead" metaphors are an integral part of the economics lexicon, and are in fact inter-woven into the concept-structure of introductory economics textbooks. Although McCloskey is an economist who examines the language of economics, his work here is not specifically addressed to his economist colleagues, but more towards those working in the education and applied linguistics discourse communities. As Tables 2.1, 2.2, and 2.3 on the analysis of economics discourse by applied linguists will show, Henderson’s collaborations with various colleagues in that field (especially with Dudley-Evans 1990, 1991, 1993; and with Hewings 1987a, 1987b, 1990) have helped fuel the interest shown by applied linguists in the study of economic discourse.

Additional studies of interest which examine or respond to the implications of the

Lexical Studies	Bramki and Williams (1984); Henderson and Hewings (1987b).	importance of lexical familiarisation strategies to facilitate reading comprehension, and students' difficulties.
Syntactic Studies	Spencer (1975/6)	specialised vocabulary: noun/verb combinations in textbooks from biology, chemistry, economics and law.
	Johns (1980)	"constellations" of cohesive devices in business discourse.
	Mead and Henderson (1983)	the relationship between conditional form and meaning in economics writing.
	Mason (1990, 1991)	the linguistic mechanisms used by economists in developing abstract concepts
	Hewings (1989); Hewings (1990)	modelling in economics textbooks, and aspects of lexical realisation
	Henderson and Hewings (1990)	the use of key words used to build economic models
	Tadros (1979, 1981, 1985)	linguistic (as opposed to economic) prediction in economics text
Cross-Cultural Aspects	Mauranen (1993)	metatext in the economics writing of native and non-native speakers

Table 2.1 Micro-studies of economics discourse

Genre Analysis	Pindi and Bloor (1987); Pindi (1988)	hedging and schematic structure within the economic survey and forecasting text genres
	Dudley-Evans and Henderson (1990a)	genre analysis of introductions to economics articles on taxation in *The Economic Journal*
Politeness Strategies	Bloor and Bloor (1991)	the ways that economists modify their propositions through hedging in economics writing
	Myers (1991)	the ways economics researchers rewrite grant proposals to two research councils
	Dudley-Evans (1991)	politeness strategies in economics writing

Table 2.2 Macro-studies of economics discourse

Teaching Techniques	Mead and Lilley (1975)	the preparation and presentation of English teaching materials for students of economics at the University of Libya
	Tadros (1977),	principles for selecting reading passages and developing relevant teaching/learning activities, preparing teaching materials for paragraph and essay writing
	Jordan (1990)	the problems that undergraduate students have with economics essays and theses
Syllabus Design	Hewings (1989)	the major reading problem areas for non-native speakers of English studying economics
	Hewings and Henderson (1987)	the teaching of economics to adults in a part-time social science degree course at the University of Birmingham
	Fisher (1990)	the relevance of recent research on economics discourse to ESP teachers and economics, economics/ESP textbooks
	Houghton and King (1990)	an analysis of classroom discourse aimed at studying the difficulties experienced by students of development economics in the University of Birmingham
	Allen and Pholsward (1988)	the reading difficulties experienced by students of economics in English in Thailand
Course Descriptions	De Escorcia (1984)	report on subject-specialist, team-teaching economics program for first-year students in a university in Chile
	Jordan (1978, 1984)	special classes organised for overseas post-graduate students in the University of Manchester
	Schleppegrell (1985)	an ESP program for Egyptian university students
	Royce (1984, 1993, 1994)	a program for senior secondary school students in Australia (1984); a reading/discussion course for economics graduates and businessmen in Japan (1993); an economics readings course for liberal arts students in a bilingual (Japanese and English) university (1994).
	Mparutsa (1991)	an analysis of the oral reports delivered by Zimbabwean economics students
	Mparutsa, Love, and Morrison (1991)	the use of concordancing programs to assist students in dealing with unfamiliar discourse in three academic subjects, one of which is economics

Table 2.3 Educational studies of economics discourse

debate about the rhetoric of economics include those in the history of economic thought, by researchers who have been examining the writings of eminent economists such as Adam Smith (Bazerman 1993; Brown 1993), Francis Edgeworth and Alfred Marshall (Henderson 1993), and John Maynard Keynes (Rotheim 1988; Anuatti 1991; Favretti 1991). Others have been analysing the more recent debates between the Chicago School's Milton Friedman and his Keynesian critics such as James Tobin (Backhouse 1993). Related work by Mirowski (1991) traces mathematical discourse in economics and its historical influence, suggesting that mathematical expression in economics discourse was neither inexorable nor unhindered, but revealed a rather disjointed narrative due to the fact that "in the context of the development of the evolution of economic thought, the participants were far from convinced that the subject matter intrinsically demanded mathematical expression" (op.cit:146). This debate is supported and enhanced by discussions relating to theory versus empiricism in academic economics (Morgan 1988), laboratory experimentation as opposed to theory-building for the study of economics (Smith 1989), and the rhetorical role of statistical testing and econometrics in economic proofs (Darnell 1991).

Although McCloskey's and his detractors' work is interesting for the insights it provides regarding economists' current views of their own discourse, the research dealing with the analysis of economics text by applied linguists represents an expanding body of work which in recent times has begun to intersect with the discussions held by economists, and reflects a growing awareness that opportunities have been created for establishing common ground between language specialists and economists. Recent reviews and overviews of this research include Dudley-Evans and Henderson (1990), Henderson, Dudley-Evans and Backhouse (1993), and Royce (1995). The work by Royce divides the research into the three categories of *Micro-studies*, where the main focus is on the analysis of lexical or syntactic aspects of economics discourse, *Macro-studies*, where the main focus is on economics discourse beyond the sentence including text analyses, and *Educational Studies*, in which the main focus is on the analysis of economics discourse for pedagogical purposes (op.cit:138). The most significant studies and their focus are summarised in Tables 2.1, 2.2, and 2.3.

2.2 The Analysis of Economics Discourse and Visual Information

The previous section examining the literature on the analysis of economics discourse by economists and applied linguists was a brief overview aimed at identifying the important research contributions, clarifying interrelationships between them, and demonstrating the main areas of analysis. This section attempts to focus specifically on selected studies in terms of how they deal with visual information in economics discourse, especially those which have made some reference to it in their analysis. It seeks firstly to clarify just what is said about visual information, and then to critically assess this treatment in terms of the aims of this study. As already outlined in Section 1.2, visual information in economics discourse refers to the various drawings, diagrams, graphs, tables, and charts that are used across the spectrum of economics discourse types (see Table 1.1). However, some of the studies which do consider visual information in some way often incorporate it with a discussion of the importance of mathematical or algebraic modes, which are generally considered as non or extra-linguistic. Accordingly, this review will not only comment on references to drawings, diagrams, graphs, tables, and charts in the literature, but also on various interpretations of mathematically-based algebraic equations and statistical formulae and their importance in economics discourse.

It will be seen from the following appraisal that although visual communication is often acknowledged incidentally as being functionally related to the verbal text (commonly in terms of co-text by the studies concerned with language education), rarely is this relationship explored or analysed in any rigorous or extensive way.

2.2.1 Visual Information as a Literary Device

Two authors from the previous survey in section 2.1 on the nature of the discussions by economists about their own discourse draw upon principles derived from literary criticism to consider visual information in economics discourse, notably McCloskey (1986) and Henderson (1986). Both discuss visuals in terms of their use as metaphor.

The discussion by McCloskey (1986) about rhetoric in economics provides some relatively useful insights into the role and importance of visual information in written economics discourse. His treatment of visual information occurs within the context of his discussion about how economists use literary devices in their "conversations" with each other, thus forming part of the discipline's rhetorical method. Linking the development of this current rhetorical form to the growth of modernism in economic methodology, he argues that although economics "conversation" has been lucid in the past, the most eloquent "conversationalists" have been the economists who have used mathematical (meaning the use of descriptive techniques derived from algebra, geometry, calculus etc.) techniques. They have drawn on model-building procedures and econometric techniques that have been derived from mathematics and/or statistics, and these include not only linear, mathematically-based methods, but also visual forms of representation such as graphs, tables and flow charts.

To support this claim McCloskey compares articles from the *American Economic Review* drawn from the period 1931-33 with those drawn from the period 1981-3. He asserts that the economists of the earlier period were naive mathematically and unskilled in conversing in "curvey metaphors", relying mostly on tabular statistics. Since the period 1931-33 he claims, there has been a clear growth in the influence and use of mathematical metaphors. As he states of his examination of the papers from the 1980's, "only six [authors] used words alone and only four added to their words tabular statistics alone, the one formal device common in 1931-33. The techniques of mathematics, statistics, diagrams, and explicit simulation, which economists had viewed once as useless and arcane, had become routine." (op.cit:4)

McCloskey reinforces this view through the examples he gives in his analysis of a famous text, Robert Solow's essay on the production function and productivity change (op.cit:83-86). This is an economic model which is often expressed in both algebraic and graphic forms. Although the main emphasis in McCloskey's book is on the role of metaphor, he points to the fact that the master tropes of metaphor, metonymy, synecdoche and irony are common in Solow's analysis. The

production function as either an algebraic equation or a function curve (a line graph) is the metaphor for decision-making in production. The use of the letters “K” and “L” in his algebraic equation as the symbols representing capital and labour are treated as an instance of metonymy, and the use of the multiplicative factor A{t} (the part) which is to be identified with technical change (the whole) is an example of synecdoche. The example of irony he gives is the only literary device which is not associated with an instance of visual communication.

McCloskey is thus working with a form of rhetorical analysis (he doesn't use this term, but uses simply "rhetoric") that has been derived from a recent American tradition of rhetoric studies, philosophy and literary criticism. McCloskey is not an applied linguist, so in some areas he is not explicit about the use and derivation of some of the analytical devices he uses (see Dudley-Evans & Henderson 1990:5), and he also relies heavily on his specialist subject knowledge (McCloskey 1986:5-6). Furthermore, McCloskey's treatment of visual information in terms of literary devices basically precludes him from examining in depth any possible intersemiotic functional relationship between the visual and verbal modes. This is of course a more linguistic task that he has not set out to do. However, the insights he has provided about the role of visual information in economics are a very instructive confirmation of its importance for the discipline, and provides an awareness of the need to develop the analytical tools to conduct further research in that area.

Henderson's (1986) treatment of visual information also occurs within the context of his discussion of metaphor in economics. Like McCloskey, he draws on aspects of the application of literary criticism, and provides some background on the use of metaphor in the debate over economics methodology and the degree to which economics is a predictive science. He examines metaphor, simile and analogy as a series of tropes under the label of metaphor, (although perhaps the classifier "figurative language" would have been more appropriate to avoid possible confusion). It is through his discussion of metaphor, the various examples he gives, and the comments he makes about them that his treatment of visual information is clarified. Metaphor, he claims, contains an implicit "as if" notion,

and economic models (which of course are often expressed in a variety of forms of visual information) are also "as if" statements about the world. Henderson gives examples of this in a macroeconomics passage where the economy is seen in a variety of metaphorical ways, one of which is as a set of graphs, the others being as something physical with gaps that need plugging, a ship at sea, a fire, a machine, or a person (op.cit:114).

Henderson's suggestion that metaphors belong to one of two basic metaphoric traditions in economics, the mechanistic and the organic, also points to the metaphorical role and importance of visual information. The mechanistic metaphoric tradition, according to the examples that Henderson uses, seems to be the one that has facilitated the growth of the use of visual information techniques in economics. This can be seen in his discussion of the predictive model of price, where the

> metaphorical (mechanistic) foundation of price theory is accepted ..... not because we think the economy is a machine but because treating it *as if* it were a machine has led to the development of a consistent and predictive theory of price by application first of the diagrammatic and later by the mathematical method already implicit in diagrams. (op.cit:115)

Here the link between metaphor and visual information is clearly established.

Henderson also discusses the difficulties that readers often have in reading and understanding diagrams. He states that people unfamiliar with economics writing will often find the diagrams of supply and demand (line graphs) difficult to understand. They may look reasonably decipherable, but the difficulty for the uninitiated lies in the fact that "....elementary supply and demand diagrams are in fact *iconic metaphors* i.e. they are like a map of a town that does not exist....or they are like maps of all possible towns of a certain type" (loc.cit.). The degree to which the language is literal can also cause some difficulty if the economics student is required to extend his or her understanding beyond the given example. Thus,

> Price in the elementary diagram is arrived at by the balance of the influences of both demand and supply. To understand and use the diagram for the analysis of real world markets, the notion of price itself must be seen as a metaphor and applied to all sorts of

> phenomena not normally seen as a price e.g. income and wages as a price for labour. ..…. There is a deceptive simplicity of diagrams combined sometimes with a spurious concreteness that makes understanding difficult and memorisation self-defeating with respect to the move from markets in general to the study of a particular market. (loc.cit.)

Again, this treatment of metaphor in economics discourse (and the visual information which is a fundamental part of it), is a useful application of various understandings from the techniques of literary criticism. However, it does not provide any real analytical insights for the linguist attempting to explain the semantic, intersemiotic relationships between the visual and verbal modes. Both Henderson and McCloskey are not linguists but economists, so this criticism should be modulated by that fact; further, their aims were clearly not to address the members of the linguistics community but their fellow economists, in the hope of improving both economics methodology and communication between economists as a result.

2.2.2 Visual information and Applied Linguistic/Educational Studies

This section will examine the treatment of visual communication from three perspectives. The first will review those studies which have primarily an applied linguistic focus, studies which aim to elucidate aspects of economics discourse to advance researchers' knowledge of how the discourse is structured and organised. The second will review those studies which focus on an analysis of economics discourse to assist the development of effective teaching programs or syllabuses, while the third examines studies which focus on the development of teaching materials and pedagogy.

Applied Linguistics. Hewings (1990) examines the problems that students have with the ways that introductory economics textbooks switch between the real world and degrees of abstraction in their explanation of fundamental theories and notions, but concentrates primarily on the ways that this is carried out syntactically in the verbal aspect of the text (op.cit:31). Despite the relevance of visual information in this switching process and the problems students have with it, Hewings doesn't directly mention the visual mode - she deals mainly with

Sinclair's (1986) general notions of fictional/non-fictional worlds, and more specific sentential aspects of Winter's (1977) work on clause relations. In the latter case, where she deals with lexical realisation (which she glosses as "specifying the unspecifics"), Hewings recommends that

> Authors of pedagogic texts, if they are efficiently and effectively to inform their readers, must employ devices which indicate something about the phrase, clause, sentence or groups of sentences that follows and how it relates back to what has been said, or forward to what is coming (1990:34).

This is an important point in that it applies equally to the visual mode. Hewings doesn't include visual information as a device or tool to "efficiently and effectively … inform their readers", which is surprising considering the fact that the authors of introductory pedagogic texts frequently and increasingly make use of different forms of visual communication. They do this explicitly through linguistic devices directing the readers, and implicitly through various semantic devices which require readers to refer forward and backwards between the modes. This is illustrated in the following extracts from the economics textbook Hewings analyses, one dealing with elasticity of supply, the other with the effect of changes in price of other goods on demand.

> Now, suppose instead we have a horizontal supply curve. Here a tiny cut in P will cause Q to become zero and the slightest rise in P will coax out an indefinitely large supply …. (op.cit:36).

And,

> A rise in the price of a commodity complementary to X will shift the demand curve for X to the left, indicating that … (op.cit:38).

Both of the above quotes implicitly refer to and assume that the reader can at least see a line graph somewhere in the textbook. The kinds of graphic visuals (supply curve/demand curve) and their component parts (P/Q, and X) which implicitly relate to these linguistic devices (termed nominal forms by Hewings) often follow or precede them on the page, and are in fact an integral part of any explication of an important theoretical model such as "The Market Mechanism", which is the theoretical focus of the above extracts.

These criticisms of Hewings (whose work on economics discourse is both seminal and extensive) should be mediated by the fact that they can also be applied to

much of the research covering the analysis of lexical, syntactic and generic aspects of economic discourse. In most mainstream and traditional applied linguistic analysis as well, visual modes of communication are sometimes acknowledged, but rarely analysed as relevant in relation to their connection to the verbal mode. They are often just simply omitted from the original texts, as in the syntactically-focused study by Spencer (1975/76). The sampling technique in this study involved randomly selecting five pages from some introductory economics, biology, law and chemistry textbooks - all were pre-university or first-year university level, "but no page containing a drawing or diagram was included" (op.cit:31). The primary purpose here was to analyse semantic combinations, reflecting the applied linguist's traditional concern with verbal, orthographic text (loc.cit.).

Henderson and Hewings (1990) continue in this vein, where they use examples which apparently did include visual information in the original extracts, which was intentionally edited out and acknowledged accordingly. The examples they quote in their analysis have, as an integral part of their message, the use of, referral to, and assumed awareness on the part of the reader of a diagram illustrating demand and supply curves, and the effect of changes on them (op.cit:44). Henderson and Hewings are not aiming to examine visual information, but they are aware of its connection with the verbal mode, and they briefly integrate that awareness into their discussion, as in

> Textbook writers frequently illustrate movements of curves and associated concepts in terms of demand changes and give less treatment to supply suggesting that the reader transfer ideas across from the way in which demand has been handled. At the same time supply, and what is to be found behind the supply curve, is normally given more detailed treatment later in the textbook. Since demand and supply diagrams are concerned with the analysis of change, it comes as no surprise that 'change' is the next most frequently used word (op.cit:48).

Henderson and Hewings also briefly refer to the importance of illustration in an earlier paper (1987b), where they focus on lexical familiarisation techniques used by economics writers. They find, that in the order of frequency of use, illustration as a lexical familiarisation technique in their sample made up 2% of the items they tabulated. As they point out, illustration "is an additional non-verbal aid to

comprehension. Graphs, tables, diagrams etc. are usually supported by references from within the main body of the text" (op.cit:125).

Other researchers who have touched on, but not focused specifically on visual information in economics discourse are Mauranen (1993), Tadros (1985), Mead and Henderson (1983), Mason (1990, 1991), Allen and Pholsward (1988), and Cameron (1991). Mauranen's (1993) study on the writing of Finnish economists composing in English focuses on metatext in its role as a text organiser. She identifies four types of metatextual organisers termed as connectors, reviews, previews and action markers, which, although they relate primarily to verbal text, are also relevant to visual information, because some of the actual examples she quotes are used to refer back or forwards to visual information, or suggest an action which can relate to visual information. For instance, Mauranen gives an example of previews such as "We show below....", which can be used to direct the reader to a visual, as can the examples of action markers, such as "to illustrate the size of this distortion..." (op.cit:10).

Tadros' (1985) research focuses on linguistic prediction in economics text by examining a corpus derived from an introductory economics textbook. She identifies six major categories of prediction. One of these, advance labelling, occurs where the writer refers to acts of discourse in advance and is therefore committed to carrying them out. This category is a notable explanation of the predictive relationship between the verbal and the visual text (referred to as ‘linear’ and ‘non-linear’ text by Tadros). Tadros identifies three types of advance labelling, the first of which is realised by linear text (although visual information may co-occur but isn't predicted). The second type labels an act which must obligatorily be realised by non-linear text, while the third act predicts two acts that may be linear or non-linear (op.cit:24-28). The characteristics of each of these three types will not be explained in depth here, but it is important to note that this analysis, within the context of an examination of linguistic prediction in economics discourse, suggests an analytical structure or framework which may be useful to adapt for use when considering other features/types of economics writing. That statement must however be qualified by the fact that Tadros' study is

aimed at an analysis of linguistic prediction only, so it may not be suitable to account for the other instances where non-linear text co-occurs but is not overtly predicted (such as a caricature in *The Economist* magazine), as is the case in the first type briefly mentioned above, and which Tadros herself identifies (op.cit:24). It is this type which is most relevant to the focus of this study.

Mead and Henderson's (1983) analysis of the use of conditionals in economics writing to realise economic predictions complements Tadros' work. The difference here is that they are working with economic prediction as opposed to linguistic prediction (op.cit:141). The authors show through their analysis that economic predictions are expressed by various conditional and non-conditional forms, and that these forms generate a range of functions or meanings. They examine the conditional forms found in introductory economics textbooks, and distinguish the various meanings that are carried by these forms. Of these forms (the predictive, the illustrative, the defining, and the directive conditional), the directive is the one which relates most closely to visual information. This functional form instructs the reader on how to interact with the economics content, requiring him or her to look elsewhere in the text, or to do something with the content being considered (op.cit:153-155). This may potentially take the form of directing the reader's attention to a graphic, or it may ask him or her to interpret a graphic. Mead and Henderson's closing comments about economic text as a result of their analysis include some conclusions about book structure and why some students experience difficulties with visual information. They suggest that the textbook they used as a source for their study has a non-linear structure (in terms of sequencing of information). They also suggest that problems may be caused for the students by the other ways that the textbook is non-linear, in situations where "reference is made to graphs and mathematical equations which may themselves be derived from earlier graphs and equations" (op.cit:140).

Mason's (1990,1991) work on abstract versus concrete language in economics is an attempt in part to deal with visual information linguistically and to comment on its role in economics text. She does this by referring to its importance as a source for writers to use where they can draw upon other semiotic systems, especially

mathematical ones to present information and "do" economics. She asserts that economics, in a similar way to other scientific disciplines, makes use of mathematical systems for modelling reality. The features of these systems can be referred to, and discussed in relation to other features in terms of their usefulness and importance, but they can really be only fully understood mathematically (1990:27). She also points out that even though economists may use mathematical language to varying degrees, they have to at some point express their conclusions in natural language, referring to mathematical systems as much as their natural language will allow (1991; see also Lemke 1990:159). This is a clear acknowledgement that there is an important relationship between verbal and visual text, as well as a suggestion of the primacy of verbal over visual modes in economics discourse.

Teaching Programs and Syllabus Design. The most notable feature about the treatment of visual information in studies dealing with economics discourse and teaching syllabuses is that they include visual information in the organised classroom activities in a variety of ways. This suggests an acknowledgement on the part of educators and course designers that visual information is an important, integral part of economics discourse, and is an area of concern in relation to specific student problems. Thus, instructors and course planners have identified a need to focus on these areas if they are going to effectively help students to develop communicative skills in economics.

Examples of papers and reports which incorporate work on visual information in their EAP teaching programs are numerous. Hewings and Henderson (1987) for example, use various methods in training their students to read bank articles, such as asking them to refer to graphs and tables, and using flow diagrams that give an overview of the information structure of the reading passages (op.cit:167 & 171-2). Schleppegrell (1985) emphasises the use of authentic materials in her course, providing examples of classroom materials that require the students to work with tabular information as stimuli for both reading and listening passages. De Escorcia (1984) also uses visual information as an aid to reading comprehension, requiring students to transfer information from reading passages to schematic form. There is

no other reference to visual information in her paper, however. Mparutsa et.al. (1991b), in their study of the usefulness of concordancing in the classroom, mention visual information only in their introduction, and then only in a subsequent reference to allowing the students to treat text examples in a non-linear fashion.

The same can be said for Houghton and King's (1990) report on the types of questions asked by students and lecturers in development economics in the University of Birmingham's economics education and ESP/EAP courses. They suggest through their examples that students are required to read, interpret and respond to numerical and tabular information in their tasks, and thus are required to develop not only linguistic competency, but competency with the mathematical semiotic system as well (op.cit:98). Fisher (1990) also refers to this requirement when she examines the relevance of recent research on economics discourse for ESP teachers and uses her findings to evaluate current economics and ESP/economics textbooks. She does this with reference to the problem areas of target students, vocabulary, discourse, culture and numeracy skills. With regard to numeracy skills, she concludes that students often have difficulty in seeing the integration between text and diagram (op.cit:91). Citing Henderson & Hewings' (1987a) finding that a major problem for students is that they react to visual information in their rhetorical roles of exemplifying and elucidating (as they have often been taught), when in fact they may need to view visual information in the rhetorical acts of presenting a problem or demonstrating an ideal state, Fisher comments that students often have difficulty in figuring out which of these rhetorical acts is being used (1990:91). Further, students sometimes have difficulties with simple numeracy, and are often mostly concerned with that, rather than with identifying whether the instance is real or hypothetical (loc.cit.).

Allen and Pholsward (1988), in their paper on the development of a diagnostic reading test for EAP economics students, provide a linguistic analysis which briefly considers the importance of visual information. In an attempt to confirm and extend the work of previous researchers, they overview the results of previous work on the main problem areas for students reading in economics; these seem to

be grammatical structures (conditionals, passives, relative clauses, logical connectives), rhetorical functions (assumption, hypothesis, prediction, explanation, generalisation), and the use of visual data (statistical tables, maps and graphs). Their own analysis of economics text in terms of lexis, syntax and discourse confirms and extends the results of their overview. They mention visual information within their section on discourse, but only briefly, since they concentrate heavily on confirming the frequency of rhetorical acts. What they do is include or pair the incidence and role of visual information with rhetorical functions in the organisation and development of the discourse structure. They identify certain regular patterns of discourse development as in statement of concept/theory/argument, explanation with examples, illustration with graphics, and then a summary or restatement of the concept/theory or argument (op.cit:61-62). The mention of visual information within this context is quite brief, mainly because of the concentration on rhetorical acts. This is significant, because the authors intuitively seem to include diagrams as part of discourse structure, and definitely include them in the test items they develop (op.cit:65). Again, then, there is an acknowledgement of the importance of visual information in economics text, but little in the way of explanation as to how it relates to the verbal.

Teaching Materials and pedagogy. In reports detailing the structure and scope of teaching materials and pedagogical techniques to assist students with the discourse of economics, brief mention is made of visual information in the context of the discussions of specialised vocabulary and rhetorical functions as potential problem areas.

Two articles by Jordan (1978,1984) are of note here. In the earlier of two reports, Jordan analyses the main language difficulties that students seem to have in coping with economics. He describes the program developed at the University of Manchester, focussing on the general difficulties they have with the subject, and on the main linguistic problems. In his listing of these language problems, he cites the students' need to understand figures as being a problem area. By this he means the use of mathematical symbols, segmental diagrams and tabular information (1978:181). His later article reports on the development of a teaching program for

overseas graduate students of economics, the methods and materials arising from an attempt to meet their needs, and the resulting higher student motivation. It gives a description of the program with examples of the materials and methods, which include work on visual information. This is in the speaking part of the curriculum, where various activities involve small groups and pairs working on role-plays, problem-solving, and an activity which Jordan refers to as “describe and draw”, which allows the students to work with tables, charts, and graphs (1984:84). The work on visual information is also integrated with the other activities, as in the small group discussions, where a role play involves a pairwork activity which provides the students with two sets of information, one of them having "statistical information (e.g., tables of economic indicators for population, per capita income, structure of imports" (op.cit:86). The students are required to treat visual information as an important part of economic text, and therefore need to develop the linguistic skills to be able to read and talk about it. Similar pedagogical techniques and points of view were expressed by Royce in various programs set up to meet the needs of university-level students attempting to cope with the demands of reading introductory textbooks and journalistic writing in economics (1984, 1993, 1994).

2.3 Conclusions

The review in this chapter has given a brief overview of the various significant contributions to the analysis of economics discourse by applied linguists over the last decade, by grouping them into three broad categories, *Micro-studies, Macro-studies* and *Educational Studies*. It has also attempted to show that this interest in economics discourse has not been confined to applied linguists, but that members of the economics discourse community have also been concerned with the nature of their own means of communication. It has been an area of lively debate, as the reactions of economists and applied linguists to Donald McCloskey's *The Rhetoric of Economics* (1986) illustrate.

The central focus of this chapter, however, has been an effort to show that although there is clear evidence of a recognition of the importance of visual forms of communication in economics discourse in the literature by applied linguists,

there is also clear evidence of a general lack of a rigorous treatment, a lack which betrays a need. Some of the studies reviewed here have treated visual information linguistically in a limited way, such as Tadros' (1985) analysis of advance labelling in linguistic prediction in economics textbooks. Many others have touched on visual information only briefly, well within the confines of the purpose of their studies, whether they be an exploration of some syntactic aspect of economics discourse, a discussion of student problems, or a report on a syllabus. The overall picture, however, is one of a need to examine and account for visual information in a more rigorous way, to ascertain just how the various visual modes utilised make and project their meanings, and more importantly, to describe, explain and account for the intersemiotic connections between them and their verbal co-text.

This raises the question as to why researchers in applied linguistics have not to any significant extent applied their analytical tools to this intersemiotic relationship, given its importance to the social sciences in disciplines such as economics or geography, and many other disciplines which often draw upon what has been characterised as scientific/positivist methodological techniques. When one considers, however, the cultural and intellectual primacy of the verbal over the visual mode since the development of writing systems in human history, the special place accorded to linguistics as the master-pattern (or *patron général)* in semiology (semiotics) by Ferdinand de Saussure (1916/66:68), and the directions that applied linguistics has taken with text and discourse analysis over the last twenty to thirty years, this lack of exploration of a possible visual-verbal intersemiotic relationship is understandable. However, given the already-mentioned changes in information technology and the increasing interdependency of the different communication modes in the information revolution, there is an increasing need for applied linguists to broaden their focus and to develop the analytical tools and frameworks which can examine and account for the ways that the visual modes not only project their meanings, but also relate intersemiotically to the verbal mode. This broader consideration of economics discourse and text, along with any insights into this intersemiotic relationship could then perhaps flow through to what seems to be an important area of research for many applied

linguists, that of syllabus development and pedagogical techniques appropriate to students' needs, whether they be first or second language learners.