Chapter 2: Literature review – *Channel hopping*

2.1 Introduction

In Chapter 1, I gave an overview of the genesis of television in order to contextualise my inquiry as well as clarify the developmental delay of instructional television in South Africa. Now, in the same way as television viewers switch channels at the flick of a remote control button in order to catch a glimpse of "what's on the box", I figuratively channel hop in order to get a sense of the literature pertinent to my inquiry. In this chapter I first discuss earlier research related to ITV as used primarily by USA, UK and Australian institutions either for formal or continuing education purposes. I document ITV experiences of both students and academic staff who have presented via ITV, synthesising these with comparative studies of face-to-face teaching and ITV classes. I also provide a cursory outline of three ITV projects in select developing countries to offset the *TeleTuks Schools* project. I then change channels to explain the theoretical thinking that guided this study, which is set against the backdrop of social communication theories. Thirdly, matters pertaining to interaction as a prime element of communication and thus evidently also the dyad of teaching and learning, receive closer scrutiny in order to illuminate possible reasons for poor learner participation during instructional broadcasts.

I have limited the review to the domain of instructional television as defined in *§1.3.2 Explaining educational, instructional and interactive television* and have only highlighted issues directly applicable to the *TeleTuks Schools* project. Having assessed an extensive but not exhaustive segment of existing literature, I also indicate what has already been achieved by preceding investigations and what still remains to be discovered, indicating how this study will address lacunae evident in this regard.

2.2 Channel 1: Interactive television reviewed

Thinking back to the very first meeting I had with the Dean to discuss my intentions of enrolling for this study, I recall with embarrassment my naïve comments related to how little was available on the subject of interactive television. Many months later I was still

scrutinising the solid base of literature that indeed existed. A review of these publications indicated a dominance of research conducted in developed countries on using ITV as an instructional delivery mode for modules or full university courses. Numerous authors (Bader & Roy, 1999; Eisenberg, 1998; Lyons *et al*., 1994; Magiera, 1994; McDevitt, 1995; Simonson, 1994; Squire & Johnson, 2000; Stuart, 1999; Swift, Wayland, & Wilson, 1997; Thoms, 1999) reported on the attempts of specific institutions, particularly in the USA, to deliver courses beyond their traditional borders to those who Cutshall and Waltz (1997) refer to as "geographically hampered" (p.22). The institutions implementing this technology (compressed video, interactive satellite television or multi-point video conferencing) traditionally use face-to-face teaching and have well resourced residential campuses supported by effective administrative infrastructure. In all cases, the decision to include rather than substitute a distance education component seemed to be based on bridging geographical distance to include small numbers of students taking specialised courses *e.g.* Nutrition (Achterberg, 1995; Cronjé & Blignaut, 2000), Criminal Justice (Lesniak & Hodes, 2000), Taxation (Engelbrecht, 2004 in press), Counselling (Stuart, 1999), Librarianship (Nahl, 1993) and various components of Economic Science courses, with several institutions offering full MBA degrees (Cirtin, 1996; Cutshall & Waltz, 1997; Heiens & Hulse, 1996; Westbrook & Moon, 1997).

These institutions opted to offer classes to as few as nine students (Jelfs & Thomson, 1996) despite the financial cost and logistical input required to set up the infrastructure. This interested me as budgetary constraints are very real concerns in my context and only projects with a high return on investment would be approved. Furthermore, this stance differed from the policy generally found amongst dedicated distance institutions *i.e.* to attract high enrolment figures in more general studies rather than serve a few in niche programmes. Squire and Johnson (2000), McDevitt (1995) and MacKinnon *et al* (1995) initiated projects aimed at augmenting studio experiences and further engaging learners through communities of practice while McCleary and Egan (1989) charted the course development and implementation process of a bi-directional audio and video project in order to provide the development team with formative evaluation measures. Jelfs and Thomson (1996) described the open learning system used by the Open University (UK) that traditionally consists of a media mix *i.e.* interactive workbooks, audio and videocassettes and occasional television broadcasts. Experimentation with satellite broadcasting was conservative and limited *e.g.* only three live broadcasts to students in Germany and five two-hour tutorials to students in Cyprus. British armed forces abroad had been receiving one-way television programmes via satellite for some years already; recently electronic mail and computer

conferencing have augmented the traditional delivery modes. This move to incorporate other technologies may well have been as a result of an unjustifiable expenditure-enrolment ratio. Although all these studies offer insight into the interactive, instructional television landscape and indicate how widespread the use of this technology is - particularly in parts of Northern America and Australia - they are probably best described as reports or evaluations of such single systems rather than theoretical contributions related to using this form of instructional technology.

Placing early studies on a chronological continuum, I found that initially the practicalities and problems of the interactive classroom as experienced by students were being documented. Students' attitudes, perceptions or satisfaction levels (L. P. Anderson et al., 2002; Beed, Gianchetta, & Withycombe, 1992; Biner, 1995; Eisenberg, 1998; C. P. Fulford & Zhang, 1994; Price & Repman, 1995; Swan, s.d.; Wynia, 2000) were also examined. Some studies compared the efficacy of the ITV class with that of the traditional face-to-face classroom (Chapman, 1996; Heiens & Hulse, 1996; Howard, 2002; Kendal & Oaks, 1992; W. W. Miller & Webster, 1997; Ritchie & Newby, 1997; Rovai & Lucking, 2003; Zirkin & Sumier, 1995) by attempting to measure student performance and satisfaction levels (L. P. Anderson *et al*., 2002; Hodge-Hardin, 1998; Pool, 1996; Wilkes & Burnham, 1991). Several studies demonstrated that attitude and achievement measures in televised instructions were equivalent or superior to face-to-face situations (Silvernail & Johnson, 1992; Swan & Jackman). Whittington (1987) reviewed over a hundred documents and concluded that students taking courses via ITV were satisfied with the delivery mode and achieved consistently compared with on-campus students. He also commented on the rigorous standards upheld by producers and financiers of telecourses to ensure an academically acceptable product. Certain studies drafted an ITV student profile and suggested characteristics of high/low-risk remote students (Biner, 1995). Others profiled a typical distance learner (Heiens & Hulse, 1996; Lyons *et al*., 1994). It was evident from such studies that the students taking a course at a distance were generally older than thirty and in most cases, female. Although the profile of the target audience described in some studies shared characteristics of the *TeleTuks* viewership in that they were young learners, they either used ITV as an essential part of their schooling (Center for Rural Pennsylvania, 1994; Estrada, 2003; T. Evans, Stacey, & Tregenza, 2001; Rowell, 1991; Simonson, 1994) or took non-formal academic courses via this mode (Love & Banks, 2001; Martin, 1996; Oliver & McLoughlin, 1996). Later, studies that documented the experiences of academic staff that taught courses via this delivery mode followed (Dillon & Walsh, 1992; Freddolino, 1996; Gehlauf, Shatz, & Fryre, 1991; Seay *et al*., 2001; Silvernail & Johnson, 1992). Some studies reported on instructor behaviour (Cuffman & Macrae, 1996; Hackman & Walker, 1990;

McKenzie *et al*., 2002) while several discussed instructional design features of ITV presentations (Achterberg, 1995; T. D. Anderson & Garrison, 1995; Egan & Gibb, 1997; Ho, 1991; Price & Repman, 1995; Wolcott & Okey, 1990). Butcher (2002) investigated, in particular, the instructional adaptations made by eight academics when teaching via ITV, comparing how this switch to mediated teaching was accomplished.

Three studies (Hootstein, 2002; D. M. Moore, Burton, & Dodl, 1991; M.G. Moore, 1995), discussed the vital role that the site facilitator plays in the success of an ITV project claiming that "the quality of local facilitation may be the most important variable in determining local success of electronic classroom instruction" (p. 38). Seemingly, research has been conducted in co-operation with key members of an ITV team yet the defining adjective of this instructional technology - *interactive* - has not received sufficient consideration. A more comprehensive definition of this variable within the context of ITV remains elusive although I elucidate on interaction as a social process later in this chapter in *§2.4 Channel 3: Interaction as a key element of instructional communication.*

Some researchers considered the complexities of the medium and offered general instructional design guidelines (Cyrs & Conway, 1997; Omatseye, 1999; Parkey, Oaks, & Peters Junior, 2000; Thoms, 1999; Wheatley & Greer, 1995). Others again, either debated the effectiveness of instructional television (Kearsley, 1998; Pool, 1996) or the challenge of harnessing the most appropriate technology to suit teaching and learning outcomes. Sargant (1997), in particular did this with special reference to adult learners in the United Kingdom. Mottet (2000) touched on how *not* being able to see non-verbal responses, influenced instructors' positive perceptions of their learners. This lack of vital communication cues - taken for granted in face-to-face contexts - has far-reaching implications: it affects interpersonal relationships between academic staff and learners and the teaching effectiveness of lecturers is appraised differently whether by themselves or their students. Cuffman and MacRae (1996) in turn, explained how students' attitudes toward learning were affected by the teacher's immediacy behaviour *e.g.* enthusiasm, use of humour, encouraging remarks, using learners' names or any method of establishing rapport. Such behaviours are significantly restricted by ITV technology. Hackman and Walker (1990) included feedback and expressive vocal quality as immediacy behaviours and found that such teacher behaviours correlated positively with student satisfaction and perceived increases of learning. These studies, like *TeleTuks Schools*, are based on the premise that interaction is an essential component of effective learning and when lacking, affects learning negatively.

The studies I read did not deal with the language of instruction as a central issue either; none even hinted at a possible tension between the primary language of the students and the code used for instruction. Thomson and Jelfs (1997) alluded to a linguistic hurdle encountered during a UK Open University project (Business School management course) using two-way interactive satellite to bring tutorials to adult learners in Cyprus. Four of the nine students were Cypriot nationals and at times, expressed concerns about their ability to understand the presenter (asynchronous sound being the actual problem) and read the amount of (English) printed study material. Engelbrecht (2004 in press) made reference to 60% of the students in her study not being native speakers of English but stated that although this may have been perceived as a limiting factor "rather than language, fear of showing a lack of insight or knowledge inhibited students from asking questions". Eisenberg (1998) reported on foreign language instruction via ITV but this study also emerged as a single institution report on the delivery of conversational Spanish, Chicano and Chinese to across-border students who otherwise could not have been served. His allusion to language as a barrier referred to giving instructions in English during a telelesson to the camera operator. This code switching, he felt, broke the mood and he thus insisted on having operators competent in Spanish[8]. White *et al* (2000) report on a study conducted in New Zealand involving learners in a multimedia language course where video rather than ITV was the primary delivery mode. The subjects were tertiary learners of Spanish enrolled for a distance-learning programme.

I found the blank screen in ITV literature relating to the language of instruction as a research theme unusual since most instruction is still language-based. Could this perhaps be the maintenance of linguistic imperialism as described by Phillipson (1992)? It appears that the American and Australian studies did not question English as the medium of instruction while it was assumed - since no explicit mention was made of the language used by the instructor - that those undertaken in Mexico and Switzerland used Spanish and French correspondingly. Although not directly linked to ITV research, Mkabela and Luthuli (1997) highlight the problematic and contentious issues pertaining to choosing a language of instruction by claiming that "The greatest challenge for education is the management of the country's [South Africa] language diversity as language will have to play a central role in bringing about equal education opportunities in South Africa" (p. 46). Several debates have been raised locally about this issue but appear in non-academic sources (Alexander, 2001; Sibaya, 1999; Van Rensburg, 2001).

[8] This was also the experience of lecturers teaching in the Department of African Languages, University of Pretoria. Only on rare occasions was a Zulu, Tswana or Northern Sotho speaker on duty as a technician. Presenters taught in an African language but switched to English or Afrikaans when dealing with the technical crew.

Another research void exists in the literature I read, since the documented cases are primarily based on models used in developed countries. In the rule, these ITV courses have been designed for academically sophisticated, small target audiences. Those enrolled are largely, adult learners in formal programmes. The studies reported equally well-equipped studio classrooms on and off-campus with trained staff at remote centres that offered both technical and academic support. Multi-point site linkage was also a common phenomenon. Moreover, these models are based on Western concepts of communication, which by implication could influence the mode of teaching and learning in a developing country context. It is thus judicious to accept that blueprints only serve where all factors are comparable. Hence it is not appropriate to superimpose practice that may be thriving in one instance on another and consider its success guaranteed there too. Since I deem that context matters in terms of decision-making and policy implementation, I refer back to my description of a developing country as outlined in *§1.4 Explanation of key terms* and outline three international ITV projects launched in such a context. An account of certain South African projects follows, after which I narrow down the aperture of the local landscape to focus on the *TeleTuks Schools* project.

Developing countries share poor socio-economic and low literacy commonalities. With reference to using forms of distance education to address the educational challenges of the E-9 countries[9], Murtagh (2001) elaborates on their common educational backlog, demand for expansion of primary literacy and better-qualified teachers. Developing countries also have a limited research tradition borne out by her reference to the "serious shortage of data [due to] … stretched resources and geographical expanses [which] make data collections logistically difficult" (p. 69). Edirisingha (1999) maligns the decision makers in ministries of education and comments on the "lack of policy guidance" (p. 1) and "the reluctance to allocate adequate funds for education" (p. 2) as well as on the lack of political will to introduce alternative ways to provide basic education. Arunachalam (1998) specifically addresses the technological inequalities experienced in developing countries, explaining how education and academia in particular, do not have access to new information technologies thus creating what he terms "information poverty" *i.e.* not only "have-nots" but also "know-nots" (p. 3). He is most concerned by the communication revolution eluding developing countries since they do not have affordable access to core information and lack the resources to build, operate and maintain the technologies involved. He, too, refers to the lack of policies that ought to promote equitable public participation in an information society. Yet correcting the technological imbalances prevalent in developing contexts competes with

[9] Bangladesh, Brazil, Egypt, China, India, Indonesia, Mexico, Nigeria and Pakistan.

the provision of basic necessities and thus the “digital divide” is not narrowed (Mutume, 2000).

With specific reference to the use of instructional television in developing countries, several practical factors hamper its impact *i.e.* not all areas are electrified and thus equipment is redundant where connectivity is problematic while lack of resources and infra structure is another. Institutions that have the necessary equipment face security problems. The equipment *per se* has good second-hand sale value, as do the copper cables that transmit the signals and thus once stolen, transmission breaks down. Furthermore, maintaining the equipment and operating it correctly requires specialised training that is not always readily available. Notwithstanding literacy levels often being below par, television has primarily been viewed as having only communal entertainment value and broadening this mind-set to include television for instructional purposes has not been successful. Okigbo (Smith, 1995) endorses this view by stating that “In many parts of Africa today, educational television is not the instant university that early advocates of instructional electronic media hoped it would be” (p. 238).

South Africa does not share so many of these inadequacies. Our situation is less dire in that, apart from having a mixed economy, the government is attempting to establish a national policy framework for decision-making and has introduced various initiatives (Bridges.org, 2002), to eliminate “knowledge imperialism” (Arunachalam, 1998 p. 4). A sufficiently developed wireless infrastructure (FM radio network) and satellite technology in the form of terrestrial and KU band satellite network, is in place (Van Zyl, 1996). According to a media survey of December 1999, South Africa is the most digitally connected country in Africa (Mersham & Skinner, 2001). Adequate and stable terrestrial telephone connections exist in many parts of the country while Internet access is freely available (De Beer, 1998). Yet low bandwidth coupled to volatile exchange rates are factors that negatively impact on extending these information and communication networks to deep rural areas.

In contrast to the African situation as documented extensively by Okigbo in Smith (1995) as well as by De Beer (1998), instructional television has been used effectively as a powerful learning resource in certain countries with a limited infrastructure. I selected three countries with an extended history of ITV, each operating on a large scale and sharing comparable characteristics with the *TeleTuks Schools* project. A more detailed description of India's Satellite Instructional Television Experiment (SITE) project, Brazil's TeleCurso and Mexico’s Telesecundaria has been included in Addendum 4. I here summarise these international projects off-setting them against the local community project in Table 2.1.

Table 2.1: Comparison of four ITV projects in select developing countries

Country	India	Brazil	Mexico	South Africa
Name	Satellite Instructional Television Experiment (SITE)	Telecurso	Telesecundaria	*TeleTuks Schools*
Date of inception	August 1975 -1976	1970 – 1985 (Re-introduced in 1994)	1968	1994 - 2004
Responsible organisation	Indian Space Research Organisation (ISRO)	Private agency maintained by largest national network Globo TV	Division of Ministry of Public Education	Community service offered by University of Pretoria institution via satellite
Target audience	Adults (family planning, agriculture, cottage industry, teacher training) Children 5-12 years (science)	Young adults who had left school before obtaining required certification (±200,000 enrolled students)	Grade 7 –9 learners 9,000 schools 600,00 students *i.e.* 15% of Lower secondary school population	Grade 11 and 12 learners preparing for matriculation exit examination. Potentially ±2,400
Support material	Limited (wall charts teachers' notes, post-broadcast discussions)	Complementary written materials, rebroadcasts, supervised study groups, textbooks	Printed material	None, except when during asynchronous interaction presenters undertake to post/fax material by choice
Viewing venue	Schools in 6 geographical clusters (2,300 villages) 150 sets were battery operated	Designated institutions *e.g.* schools, factories, churches, ships and prisons	Secondary schools in remote, rural areas	72 schools equipped by sponsorship; some purchased own
Delivery mode	150 pre-packaged science programmes, 10-12 minutes in duration Produced in Hindi and dubbed in Oriya	Similar to commercial TV programmes with actors and authentic employment settings, plenty of humour, fast-paced	Live, facilitated broadcasts. No indication of synchronous interaction. Multi-point linkage	Live, bi-directional audio broadcasts, "Talking head"
Time of broadcast	Unknown	6:00-7:00 am with rebroadcast later	6 hours a day (20 minutes viewing, 40 minutes discussion)	After school 14:30 – 16:00 during academic term, also Winter and Spring school
Perceived success rate	Very high but short lived: Reached ± 30% who had never had contact with mass media & average daily attendance per set stabilised at 80-100 viewers	Very high	Very high	Interview data suggests very high

With regard to my immediate context, a host of local and international organisations have all been involved in various projects related to improving the culture of learning and teaching in South Africa. An example of a current instructional initiative on the national television network is *Learning Channel.* The format of this programme is very similar to *TeleTuks Schools* except that broadcasts are transmitted on national television during school hours and then repeated at learner-convenient, after-school times. No multiple site connections exist either although discrete links and planted questions from selected schools are relayed to the studio presenter suggesting a semblance of interaction. In the recent past, other initiatives included:

- *UBUNTU EduNet*, a satellite based interactive training system operating on a franchise principle launched in 1995. It offered courses like Adult Basic Education, business skills and various schools subjects. The broadcasts were structured in a similar fashion to *TeleTuks* although more extensive and immediate interaction was possible owing to a sophisticated network of independent public phone companies and Digital Video Compression technology (Smit, 1996).
- *Africa Growth Network* (AGN) a commercial concern, pioneered the application of innovative teaching technologies and launched *PowerMatric* in 1996 intending to provide affordable learning opportunities to adults who for socio-political reasons had been denied the opportunity of gaining a Matric certificate (Sunday Times, 1996). This 22-million Rand initiative was ahead of its time yet its demise was a combination of factors relating to insufficient market research, unattainable economies of scale and too many competing stakeholders (Kobus Kruger - telephonic communication, 8 March 2004).
- *Mindset* is a non-profit organisation aimed at the personal, social and economic empowerment of Africans through the provision of quality education. It produces, packages and delivers on a mass scale, digital content that is transmitted through satellite in video, web and print form (Fatima Adam, personal e-communication, 27 September 2004). The company had aimed to have three satellite channels running for eight hours a day by the end of 2003 but the channel geared towards meeting the needs of primary schools and Early Childhood Development (Grades 0 – 7) has not yet been introduced. The two existing channels serve Further Training and Education pupils (Grade 10 – 12) and another channel has been dedicated to Healthcare instruction. Management plans to introduce a further four channels specialising in tertiary and vocational training. *Mindset* is unique in that it offers teachers flexible access to teaching material. Video footage is saved on a database server and can be retrieved from the Web on demand. Doherty (2003)

claims that “We are modelling what could be an educational solution for other third world environments” (p.13).

- *Memar TV* a joint venture company (Kagiso Educational Television and Sasani Limited) formed in May 2003, specialises in high volume educational content production for primary and secondary schools. The company won the tender to produce 2,978 programmes for the Ethiopian Ministry of Education based on their national secondary school syllabus (Grade 8 – 12). These programmes will reach 6,000 Ethiopian classrooms via digital satellite system (Memar TV, s.a.).

These initiatives all shared the vision of recruiting good teachers as ITV instructors and extending their reach through satellite technology in order to address the challenges of education in South Africa. The first two are defunct while the third uses video streaming, which requires computer infrastructure. Others like *Memar TV*, have lower profiles but are still operational. I now change focal plane to sketch the context of *TeleTuks* as an ITV community project.

Education as a social issue is generally a prime concern in most societies. In South Africa, it has been highly politicised and emotionally charged for years. As the legacy of a separatist policy is dismantled at all levels, the restructuring of education is, in turn directed at initiating fundamental transformation in the character and content of this system. High on the list of educational priorities are projects to restore a culture of teaching and learning within new curriculum frameworks as the merging of historically diverse systems into a unified democracy continues. Another strong focus area is improving the national Grade 12 exit examination pass rate with special reference to a better performance in Mathematics and Science. South Africa rated very poorly in the Third International Maths and Science Survey undertaken in 1996 as a USA national education department initiative. This international achievement survey ranked secondary school learner performance in the sciences per country and was again administered in 1999 (Howie, 2001).

In an endeavour to help address some of the educational needs of a developing country, the University of Pretoria, entered the challenging field of interactive teleteaching and in 1994 officially launched, as part of its academic offering a community project aimed at assisting senior secondary school learners prepare for their final exit examination. The *TeleTuks Schools*
project shares many characteristics of traditional distance learning courses, primarily that of geographic separation between sender and receiver, yet it is not classed as such. Its

nature is chiefly service-oriented, participation is voluntary implying that learners are not dependent on watching broadcasts in order to be academically successful, and the transmitting institution confers no formal qualification. Furthermore, although broadcasts are transmitted after school hours, they take place in real time thus not permitting the learners flexibility or choice of study time. It does, however, conform to the common understanding of distance education as described by Moore and Kearsley (1996):

> The interplay between people who are teachers and learners in environments that have special characteristics of being separate from one another and a consequent set of special teaching and learning behaviors. It is the physical distance that leads to a communication gap, a psychological space of potential misunderstandings between the behaviors of instructors and those of the learners (p. 200).

During the research period, broadcasts have been beamed via digital satellite to 72 schools that have been equipped using sponsorship money. These schools are all situated in the geographic region formerly known as the Transvaal, now considered as four of the five inland provinces, namely Gauteng, Limpopo, Mpumalanga and North West (Addendum 2). These schools are primarily located in under-developed rural areas although some township schools are also participants. Township schools – a legacy of the Apartheid education policy – serve Black[10] peri-urban settlements. Schools in the other five provinces have not been equipped purely for logistical reasons.

As stated in the *TeleTuks Schools* Policy Document for Schools and Sponsors (Sedibe & Evans, 1999), the intention of the project is "not to replace educators at schools, but to assist learners with quality education in the more difficult aspects of the subjects" (p. 2). The lessons are generic and aim to review, rather than introduce new content. Logistics, however, prevent printed support material being offered. This initiative is currently aimed at senior learners aged 16 - 18 (Grade 11 and 12), who can watch 90-minute lessons in key subjects *e.g.* Mathematics, Physical Science and English, four afternoons a week of the academic year. An average of 30 hours per academic subject is screened annually and the national core syllabus is the main guide to planning lesson content. There is a potential audience of several thousand Grade 12 viewers per daily broadcast.

The primary mode of content delivery during each *TeleTuks* broadcast alternates between traditional "talking head" explanations and any visual material the presenter uses to clarify concepts. A key feature, however, which has distinguished these learning opportunities

[10] I am not comfortable with this appellation but historically the composition of the South African population has been based on race classification. I use this categorisation (capitalised and not as an adjective) to clarify the particular ethnic group as prime target audience.

from similar educational projects, is that learners can ask questions at any time during a broadcast to which the presenter will then respond immediately. This bi-directional audio communication during a broadcast is established telephonically. The learner's phone call is piped into the studio while the presenter's response is transmitted directly on-air using a microphone. No multi-site audio or video linkages exist. Direct interaction is sought through presenter-initiated questions as part of the instructional design; or during a planned Question-and-Answer slot. At times, learners are requested to solve problems or discuss options with a classmate. While completing such tasks, the presenter is blanked out by the University logo and background music plays. An invitation to call in to the studio with comments or queries is also regularly crawled across the screen as a chiron. Phone calls or faxes received after the broadcast are dealt with during the subsequent session. This ability to interact has been used as a marketing ploy of the project based on the widely accepted premise that interaction improves learning. However, presenters have been puzzled by the observation that in spite of the technological system that allows for two-way audio communication and thus oral interaction, learner participation is less than expected during broadcasts. Interaction - as anticipated by the project team - remains exceptionally low despite structured opportunities and various strategies being applied to elicit more reaction, *e.g.* peak caps or poetry discussion guides being offered as rewards for asking questions. It is this lack of oral interaction, which prompted my inquiry.

A review of similar instructional television projects in Ivory Coast and Mexico (Shrestha, 1997) revealed comparable social and pedagogic circumstances to those of learners participating in the *TeleTuks* community project but there too, no reference was made to either concerns about interaction or the language of instruction. Further probing of the literature with special reference to the use of instructional television in developing countries on the African continent, in Asia and South America may offer relevant insight into the South African situation. To date, however, a paucity of literature describing the ITV experience of African learners with deficient target language proficiency is apparent. I thus argue that existing research does not adequately describe low learner participation during televised instruction in a developing country context. I next address the elements of social communication as found in human interaction, using these as the theoretical framework within which this study is set.

2.3 Channel 2: Social communication as theoretical framework

The essence of human communication is interpersonal engagement and most social, as opposed to technical models illustrate the communication process as one that is ongoing, initiated by a sender and reacted on when the receiver gives feedback in some manner. This repetitive communicative action, broadly speaking, never ceases but can be divided into various episodes and takes diverse forms *e.g.* non-verbal communication. Anything that impedes communication has been labelled as noise. This does not only refer to literal sounds which could be distractive or distort the message, but also includes the aspect of semantic noise *i.e.* not comprehending the verbal code being used or even not having sufficient proficiency in that code. Communication is inevitably influenced negatively (Du Plooy-Cilliers & Olivier, 2001; Erasmus-Kritizinger, Bowler, & Goliath, 2001; Steinberg, 1995; Van Schalkwyk, Viviers, & Van Aswegen, 1989; Van Staden *et al*., 2002).

The present framework of communication, within which I thus locate my research, is a distillation of several Western models as well as the theoretical contributions of notably Moore (1989), Laurillard (1993), Zhang and Fulford (1994), Kearsley (1995) and Wagner (1997). I have worked with these in the apparent absence of a localised model and acknowledge that they may include cultural shortcomings when applied to my context. I shall also draw attention to how implementing a mass medium as delivery mode for instruction strains the traditional notion of communication. As I worked trans-disciplinary[11], I could not confidently choose a single theoretical framework but worked within the parameters of social relationships and language rather than selecting a technological or media science focus.

As early as the fourth century B.C., the Chinese philosopher, Confucius along with his Greek and Roman counterparts Plato, Aristotle, Cicero, and other intellectuals, were already formulating ideas about human communication and its importance as a social skill. Despite these classic contributions, communication as a field of academic study only became established at Western universities in the twentieth century (Steinberg, 1995). Communication technologies have proliferated through the ages, yet the essence of human communication remains interpersonal engagement and I locate this inquiry within

[11] Trans-disciplinary means working across disciplines in ways that create new knowledge that the individual, constitutive disciplines could not. Interdisciplinary implies the additive value of another discipline in creating knowledge (Jansen, personal communication 3 December 2002).

the parameters of a broad communication framework, drawing on several traditional models as summarised in Table 2.2.

Table 2.2: Synopsis of some communication theories

Theorist	Year	Basic tenets of theory
Classic: Plato, Aristotle, Cicero	3 - 4 BC	Rhetorical skills can be learnt. Argument and eloquence is as important as delivery. Orator's ability to persuade determines reaction of audience.
Lasswell	1948	Designed an interrogative quintet - a questioning device used for analysis of mass media. Emphasis is on effect of message.
Shannon and Weaver	1949	Engineers for Bell Telephone Laboratory. Technical model based on improving signal transmission by eliminating in particular technical disturbances (noise). Linear model; no provision for feedback. Concern is with clarity of message rather than meaning.
Schramm	1954-65	Three models initially linear – later dynamic interchange of meaning. Focus is now on mutual roles of communicator and recipient as well as their interpretation of the message.
Jakobson	1958	Linguist. Two-pronged model: constitutive factors and functions Concerned with notions of meaning.
Berlo	1960	Sender-Message-Channel-Receiver (SMCR) model. Acknowledges social system in which communication takes place. Linear flow of communication and feedback implied. Focuses on match between source and receiver.
Dance	1967	Spiral/helical model suggests communication is dynamic and affected by its past behaviour but does not return to exact point of source.

Steinberg (1995) claims that Dance and Larson in their 1976 publication, *The Functions of Human Communication: a theoretical approach* recorded 126 definitions of communication with more being formulated. This is confirmed by Erasmus-Kritzinger (2001) who states that her more recent investigation uncovered 150 different definitions. Defining communication depends on whether one approaches it from a technical point of view or a meaning-centred view. The former focuses on the transmission of messages from point/person A to point/person B with the emphasis on improving clarity, speed, and accuracy of the communication. A meaning-centred point of view would formulate a definition to elucidate the dynamic process of creating and exchanging meaningful messages *i.e.* interaction between the various participants (Steinberg, 1995).

Several authors describe traditional Western models of communication and suggest that this human activity is an ever-changing process in which participants share responsibility for creating meaning (Du Plooy-Cilliers & Olivier, 2001; Steinberg, 1995; Tubbs & Moss, 1994; Van Schalkwyk *et al*., 1989; Van Staden *et al*., 2002; Verderber & Verderber, 1998). Drawing on these definitions, I herewith offer my own synopsis that encapsulates the core characteristics of interpersonal communication.

Communication is a functional, dynamic process whereby two or more participants purposefully attempt to share meaning. In order to interact successfully the parties need to have a mutual code *i.e.* a shared set of symbols in which to convey the information or ideas. In order to promote understanding, both parties need to deliberately take responsibility for carefully encoding (sending) and decoding (interpreting) of verbal and non-verbal messages. This exchange of utterances or behaviours takes place via a medium that links the participants *e.g.* print. Any distortion or interference (not necessarily audible), which negatively influences the message, is considered noise. The greater the physical distance between sender and receiver, the fewer senses can be used to interpret and return messages. These communication elements are all part of any instructional context. Geographical distance complicates the communication process by making it more difficult to gauge the success of the initial message *i.e.* correctly interpret its nature and meaning (Watson & Hill, 2003) while psychological distance could be bridged by an invitational delivery style and appropriate immediacy behaviours. In order to understand the transmission mode, which characterises *TeleTuks*, I have briefly described various communication models, chosen specifically because they relate pertinently to interaction or mass media.

The classical view dating back to Plato and Aristotle regarded communication as a linear and to a degree, one-way action relying on the competent construction of an argument to convince an audience coupled with a powerful delivery of the speech. The underlying assumption was that good communication could be taught and practised. The communicator was active and the message was relayed one-way to a passive audience. The effect of the communication was measured not by audience response but by the skill of presentation. Good orators were highly respected and admired by the populace. The modern analogy to prime time TV anchors or talk-show hosts basking in their audiences' adulation is not lost here.

Twentieth century views of communication stem from many practitioners and theorists alike. Depending on the field of research, names like Berlo or Dance and Jackobson are among those who have made significant contributions to the theory of communication and I do refer to them where relevant. However, I have selected to comment on the models of Lasswell, Shannon and Weaver, and Schramm since apart from conceptualising certain issues pertinent to *TeleTuks*, their models also relate more specifically to matters of mass media.

Harold Lasswell, an American political scientist whose main area of interest lay in propaganda focused on the effect of the message on the recipient *i.e.* the intent of the sender to persuade the receiver to adopt a particular point of view. His model or rather questioning device, is based on an interrogative quintet: *Who? Says what? In which channel? To whom? With what effect?* (Watson & Hill, 2003). This 1948 model of communication is an elementary way of interpreting the transmission and reception of mass media messages. It suggests the relationship between the separate components of the communication process as well as the sequence in which each action occurs. He shares the classical view that the outcome of the message ought to be the persuasion of the recipient to adopt the sender's viewpoint. His model is applicable to *TeleTuks* in that its primary focus is also on the verbal message that is not bi-directional, making the sender the active participant while the audience (receivers) play a passive role. To a degree, the viewers are also "expected" to accept the message unquestioningly. Lasswell does, however, allow for a variety of outcomes of the communication, some even being unintentional (Steinberg, 1995).

In 1949, while working for the Bell Telephone Laboratory in the United States, C. E. Shannon and W. Weaver proposed a model that was to become the most influential stimulus for the development of other theories and models in communication (Wagner, 1994). Their *Mathematical Theory of Communication* has since been applied to a range of information transfer situations, most notably the binary system used in computing. Regardless of whether the systems were human or mechanical, these two engineers were chiefly interested in solving problems related to signal transmissions. Also called the technical model, Shannon and Weaver's model depicted communication as a linear, process-centred model describing the sequences of transfer. However, neither of them was concerned with the actual content of the message or the meaning that was conveyed. Their aim was to improve the transmission process, and they thus focused on how channels of communication could be used most efficiently *i.e.* being able to send the maximum amount of information along a given channel. They also paid attention to how much of the signal was lost through noise and how to minimize these distortions. The Shannon and Weaver model included mass communication but its main inadequacy - when applied to human communication - was that it made no provision for feedback. Neither did it acknowledge the importance of context *i.e.* the diverse ways in which messages can be interpreted based on the social, cultural or political frame of reference of the communicators. Shannon and Weaver assumed that noise was restricted to physical noise that only arose externally in the channel. By implication, the audible clarity, and not

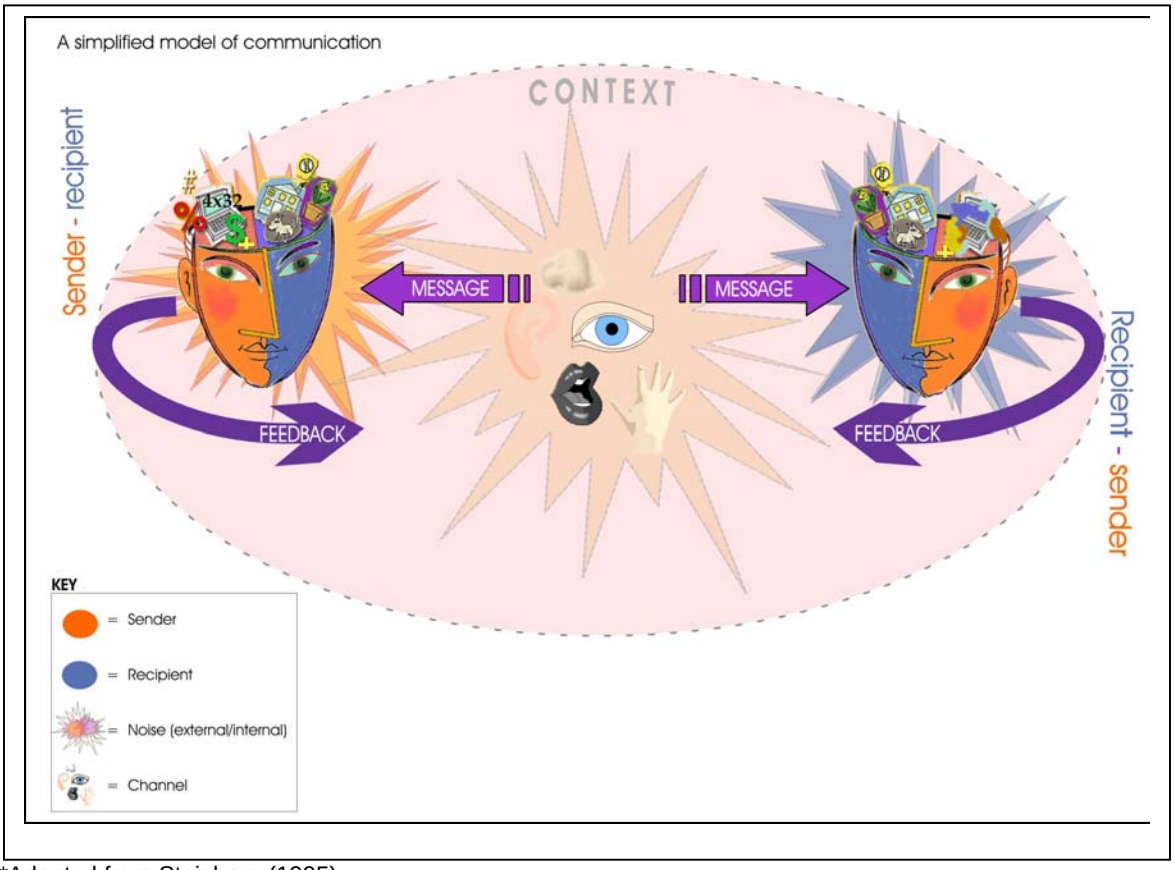
the actual message, was more important. In this study, I exploit their notion of noise being solely an untrammelled delivery.

Wilbur Schramm was the first scholar to describe communication as an interactive process and a close study of his three models developed in 1954 enable us to comprehend the progression in his thinking on the subject. His focus was more sharply on mass communication than the technology that delivered it and his definition of communicator is broader than that of his predecessors (Watson & Hill, 2003). When referring to the source (sender) he includes a communication organisation like a newspaper, publishing house or television station. In turn, Schramm refers to the receiver as the destination and means an individual or a particular group, for his purpose – a mass audience. He also broadens the medium to include anything that can convey a message, also non-verbally. His *fields of experience* suggest a shared frame of reference that would include a common code *e.g.* a language and culture (Steinberg, 1995). In his last model, Schramm introduces feedback in an attempt to reduce noise in the communication process. He defines feedback as the ability to determine how a message has been interpreted. The communicator can adjust or elaborate on the message if the receiver is not clear about the intended meaning. Schramm's models focus more strongly on the meaning and accept that there is no single interpretation. Both source and destination act as communicators at various stages and that communication is two-way. The channel by which the message is transmitted is less important than the interpretation of the message by the people involved. This model is the closest to what instructional television ideally resembles: a turn-taking to express and interpret messages. Schramm's model suggests this turn-taking by separating the transmission and feedback elements (Watson & Hill, 2003). *TeleTuks Schools*, however, lacks the sophisticated bi-directional video technology that would enable communicators to also decode vital non-verbal signals.

These earlier models laid the foundation for more recent thinking which considers communication to be a complex transactional process (Du Plooy-Cilliers & Olivier, 2001). The inference is that interpersonal communication is not merely a transmission of information between two parties, but rather a transaction in which the meaning of the message is negotiated. This model also suggests that the sender and receiver do not necessarily take turns to express and interpret messages, but that both parties are actively and *simultaneously* engaged in the process of making meaning. There is thus no longer an isolation of communicator roles as messages are continually passed between two parties after being internalised. The outcome of the communication encounter is thus determined by the mutual involvement of the participants in negotiating meaning

effectively. The closer the outcome mirrors each party's expectation, the more successful the transaction is perceived to be although a total overlap of shared meaning is not possible (Cleary, 2003; De Beer, 1998). This model, however, is also not fully compatible with the context of this study as the negotiation process used in *TeleTuks* is flawed, primarily by the time delay and lack of visual cues for the presenter. I have endeavoured to illustrate my understanding of interpersonal communication in Figure 2.1 using colour to represent communicator roles.

Figure 2.1: A simplified model of social communication *



*Adapted from Steinberg (1995)

When human communication is not a direct act between two parties, but mediated by newspapers, radio or television, it still includes the basic elements of interpersonal interaction although the feedback element is less distinct. Often there are multiple sources of mass media messages that are initiated, selected, processed, interpreted for and finally distributed to the recipients who in turn, are generally sizable, heterogeneous and anonymous audiences. However, the process of creating and negotiating meaning from such messages still takes place. Particular modes of symbolic representation exist in television (Jonassen, 1996) and it is due to this difficulty of not sharing a common frame of reference with the recipients, that the communicators' intention could at times, be

misinterpreted resulting in “unforeseen latent dysfunctional or negative effects” (De Beer, 1998 p. 8). In order to eliminate noise in mass media communication, researchers rely on audience segmentation to identify a typical reader, listener, or viewer and thus formulate their messages accordingly. These often having a profound and pervasive effect on society by influencing the values, attitudes and lifestyles of people (De Beer, 1998). The *TeleTuks Schools* broadcasts match some of the characteristics of a mass medium as the audiences are large and anonymous, albeit more homogenous than public TV audiences. Establishing audience feedback is also simpler although delayed and not necessarily spontaneous. Another common trait that *TeleTuks Schools* shares with public television is the inability of the sender to see the recipients. This is a complicating factor in the interpretation and understanding of the message. However, the impact of such instructional messages, are not as great or powerful as those transmitted by other mass media yet serve too, as “instruments of enlightenment” (Steinberg, 1995 p. 182).

The studies I reviewed made scant reference to theories that relate to communication. Some research - more specifically associated with distance education projects - referred to *dialogue*, *transaction* or *conversation* (D. Laurillard, 1993; Materi, 2002). Juler, (1990) introduced the concept of *discourse* as a way of considering the educational experience available through distance education and Holmberg *et al* (1982) discussed *guided didactic conversation*. Moore (1989) with the notion of *transactional distance*. Both these studies were constructive for defining my theoretical framework more clearly as explained later in *§2.4 Channel 3: Interaction - a key element of instructional communication.* In *§1.4 Explanation of key terms,* I decoded interaction as a construct of communication describing it as a concatenation of initiation and feedback. I switch channels now to take a more-in-depth view of this concept.

2.4 Channel 3: Interaction - a key element of instructional communication

Interaction is not necessarily as ill-defined a concept as many suggest (Borsook & Higginbotham-Wheat, 1991; Main & Riise, 1995; McMillan & Downes, 2000; M.G. Moore, 1989; Wagner, 1994). There are instead many loose notions of what - in its broadest sense – signifies a communication act between two parties. A technical definition of interaction implies the continuous transfer of information between points. In a socio-cultural sense the core of this term suggests the process of various behaviours executed by at least two parties who adhere to rules and symbols common to their social system in

order to exchange meaning. Interaction occurs when these two parties mutually influence each other by changing behaviour or attitudes (Wagner, 1994). Interaction also assumes different meanings in different applications, cf. a telephonic conversation or a trainee in a flight simulator. In the computer-mediated environment, interaction usually refers to the amount of control users have over their learning by being able to manipulate navigational routes. Some helpful insight regarding interaction was gained from work researching this aspect as used in personal computing and multimedia (Borsook & Higginbotham-Wheat, 1991). Cronje (1996) relied heavily on this latter study for his work in which he examined the levels of interaction, intensity, and participation-ratio followed by suggestions for improving instructional design in order to make viewing less passive. This mediated form of interaction also often filters out the social cues which personalise human interaction (McMillan & Downes, 2000). A further distinction can be made between synchronous and asynchronous interaction. The former takes place in real time during the instructional setting and shares some conversation-like characteristics while the latter points to communication that is delayed *i.e.* usually occurring after the instructional session. The rate of interaction however, decreases with large audiences or when used as an asynchronous mode.

In order to establish a common understanding of what interaction is within the ITV domain, I offer some definitions and opinions as found in particularly the literature on distance education. Moore (1989) states that in the distance education domain, the term interaction carries such nuanced meanings and suggests that specific sub-meanings need to be defined and agreed upon. He asks that distance educators, in particular, agree on three distinct types of interaction: learner-content, learner-learner and learner instructor. These three relationships that have become the yardsticks for designing interaction in distance programmes and Moore's focus is on the various role payers involved. He continues by stating that the nature of distance education requires any educational transaction to be mediated by the use of print or electronic or mechanical communication devices. Nonetheless, he does not include technology as a fourth dimension of interaction as do Hillman *et al* (1994). These researchers are of the opinion that learners need to have acquired the necessary skills in operating the mechanisms of the delivery system in order to successfully interact with the instructor, other learners and the course content. They consider "Successful interaction in the mediated educational transaction [to be] highly dependent upon how comfortable the learner feels in working with the delivery medium" (p. 32) and augment Moore's (1989) three types of interaction by identifying a fourth dimension: learner-interface. Salomon (1979) supports this view and also suggests

that a learner needs to know the rules of interaction related to a specific medium in order to successfully extract the desired information.

Although used interchangeably in much of the literature, Wagner (1994; 1997) in turn, makes an interesting semantic distinction between *interaction* and *interactivity*. She purports that interaction involves behaviours where individuals or groups typically influence one another as exemplified by a learner asking a question and the presenter replying. Interactivity, on the other hand, is the technological capability of establishing connectivity in real time. The focus here is on the attributes of the technological systems used to transmit information rather than an attribute of instruction. This distinction is not so stark in technology that permits high interactivity *e.g.* ITV also allows for person-to-person or person-to-system interaction (Roblyer & Ekhaml, 2000). These latter researchers choose to define interaction in terms of connectivity and ability to transmit or convey information. Several authors offer definitions of interaction relating to the affective experience of viewers rather than technical connections. Daunt (1997) suggests that interaction represents the connectivity the students feel with the instructor. Edmonds and Reed (1997) seem to equate interaction with a "sense of belonging together with reduced feelings of isolation" (p. 143). Shin (2002) describes the notion that a viewer may have of sharing a reciprocal relationship with the presenter as "transactional presence" (p. 123). This lessening of the psychological distance, which viewers may experience, is similar to Moore's transactional distance. Several researchers (Borsook & Higginbotham-Wheat, 1991; Cronjé & Blignaut, 2000; D. Laurillard, 1993; Main & Riise, 1995; Reeves, 1999; Simpson & Galbo, 1986; Stirling, 1997) attempted to qualify this concept or identify various dimensions of interaction. Zirkin and Sumier (1995) advocated a "continuum of interactivity" (p. 102) implying a hierarchy of learner involvement while others viewed interaction in terms of frequency and type. In turn, some authors addressed interaction in distance education *per se* and offered rubrics (Roblyer & Ekhaml, 2000) or taxonomies of interaction for evaluation and research purposes (Jonassen, 1985 ; Main & Riise, 1995). Jensen (s.a.) revisited ITV using a matrix typology that describes eight information traffic patterns and like Wagner (1997), proposes a conceptual distinction between the sociological concept of interaction and the communication-scientific concept of interactivity reserved for mediated communication. Simpson and Galbo (1986) define interaction in a social context as

> All manner of behaviour in which individuals and groups act upon each other. The essential characteristic is reciprocity in actions and responses in an infinite variety of relationships: verbal and non-verbal, conscious and non-conscious, enduring and casual. Interaction is seen as a continually emerging process, as communication in its most inclusive sense (p. 38).

In instructional settings, interaction implies an active participation in the learning event or as Mackin and Hoffman (1996) consider interaction - engaging the learner in *doing* something which leads to cognitive processing. This argument aligns with that of Oliver and McLoughlin (1997) who extensively researched various aspects of ITV and propose that any learning environment that provides a learner with more than a passive experience can be termed interactive. They, however, do not distinguish between synchronous and asynchronous interaction, which is also a determining factor. Reeves (1999), in his discussion of interactive learning systems as resources *from* which people can learn or resources *with* which people can learn, loosely defines an educational communications theory as the deliberate and intentional act of communicating content to students with the assumption that they will learn something "from" these communications. He elucidates with four instructional processes inherent to the "from" approach *i.e.* learners are exposed to messages encoded in media and delivered via an interactive technology. This is followed by the assumption that learners can perceive and encode. The next step requires a response to indicate that the message has been received and is finally followed by feedback regarding the adequacy of the response. This feedback serves to modify or reinforce the behaviour of the original producer of the message. This implies that in a classroom, should the teacher correctly interpret the feedback she gets from learners, she will know to what extent they have comprehended her message and whether she needs to elaborate, rephrase or continue. Without feedback, meaningful interpersonal communication ceases. In instructional settings the outcome of various interactional episodes also suggests some demonstrable cognitive or motoric advance or change.

The essence of instructional television is teaching *i.e.* conveying new information to recipients who attempt to make sense of it. The word "*teach*" however, inherently carries the connotation of control and mono-directional talk by the instructor that closely resembles the mode manifested in the *TeleTuks Schools* broadcasts. Interaction however, evidently remains a sought-after element of instructional events, more so when the sender and receiver are separated by distance. Interaction is well established in professional education as a significant aspect of the learning process as Monson (1978) states: "A quick glance at any research journal whether it be in the field of communication, adult education or educational psychology underscores the importance of participation" (p. 17). Much empirical research attests to the importance of the teacher-student and student-student interactions for successful teaching episodes. Laurillard (1994) describes

learning as an interactive process without which concepts, skills and knowledge tend to be inert and lacking in the generalisability needed for transfer to other domains. Her conversational framework that suggests a one-on-one interaction as necessary for learning potential to be realised, is not feasible in the *TeleTuks Schools* context where a single presenter communicates with many diverse and unknown learners. A television set, unlike the telephone, is not an interactive communication medium yet ITV attempts to approximate the face-to-face classroom where interaction in its ideal form has come to represent the offering of opinions or raising of questions, in short a cognitive engagement about subject content with both expert and peers. Laurillard (1993) refers to this shared knowledge as the "negotiated commodity" (p. 83).

An underlying assumption in such studies is that interactive learning environments are not only crucial but also superior as they foster deep learning (Cronjé, 1996; Oliver & McLoughlin, 1996; Reeves, 1999; Zhang & Fulford, 1994). For example, Kearsley (1995) emphasises the desirability of interaction as an instructional element of contemporary distance education claiming that a high level of interaction positively affects the effectiveness of any distance education course. He is, however, doubtful whether interaction improves the quality of learning. Although as Hergenhahn and Olson (1993) claim, "there is increased concern with the application of learning principles to the solution of practical [human] problems" (p. 465), I do not intend researching the complex process and effects of interaction on learning in this study and have not attempted to relate my study to a particular learning theory either. However, the overt interactional behaviour displayed by either presenter or viewer in the *TeleTuks Schools* context could be associated with Behaviourism in terms of the action-reaction-interaction theory yet it would be unwise to claim that the indiscernible higher mental processes that presumably take place within the Grade 12 learners are ultimately related to constructivist or cognitive theories. These complex constructs, particularly in the e-learning domain deserve exploration later.

Although I was unsuccessful in tracing studies that argued whether synchronous or asynchronous interaction is preferable for effective learning, I found research indicating that the potential of authentic learner participation via technology, is evidently not being realised despite the apparent advantage of synchronous interaction offered by current technologies (Oliver & McLoughlin, 1996). Returning to the ITV case studies and single institution reports, two studies (Lyons *et al*., 1994; R. Oliver & C. McLoughlin, 1997) recorded between four and eight calls per sixty-minute broadcast but acknowledged that students initially required a degree of encouragement to call in. Oliver and McLoughlin

(1996) investigated teaching strategies to determine in what way instructors were using the interactive capabilities of ITV. They identified different kinds of interaction and found that the most frequently used type was expository and involved answering a direct question, either asked by the students or the instructor. They also sought to describe the impact of these interactions on subsequent instructional activities. This study in particular, was useful in helping to structure my data collection.

In all the studies reviewed, various strategies for encouraging interaction and improving its quality were offered (Cyrs & Conway, 1997; McHenry & Bozik, 1995; Ostendorf, 1989; 1997). Researchers agreed that for meaningful interaction to occur, it needed to be explicitly designed. However, there was also the acknowledgement that even simple forms of interaction are time consuming (Dillon & Walsh, 1992; Kearsley, 1995). No further explorations regarding the reasons for poor learner participation were forthcoming. Howard (2002) observed interaction patterns in ITV classes and noted that either students sought assistance from each other or off-topic dialogue took place similar to disruptive students whispering in a face-to-face classroom. Almost no verbal interaction occurred between the instructor and the remote site students. Rao and Dietrich's (1998) exploratory study, compared the behaviour of students at the main and remote sites and found that very little interaction took place. In some instances a 0% was recorded. Observable interactions included requests for clarifications and responses to direct questions. Their findings suggest that some students found it difficult to ask questions as they usually relied on nonverbal signals to catch the instructor's attention and this was not possible at a distance. Others were reluctant to be on camera. Some researchers ascribed this reluctance to technological intimidation since interaction seemed to improve as ITV became a more familiar delivery mode (Eisenberg, 1998; McHenry & Bozik, 1995; Rodriguez, 1995). Oliver and Grant (1995) found that not only were real-time interactive calls infrequent but they tended to take a considerable amount of time to conclude. In some instances, calls of longer than ten minutes each were registered. On the other hand, off-air interaction between instructors and viewers was significantly higher. This too, was the case with the *TeleTuks Schools* project and would therefore seem to support the general human preference for asynchronous interaction as explained by Gates (1995):

> It is human nature to find ways to convert synchronous communication into asynchronous forms. Before the invention of writing, 5,000 years ago, the only form of communication was the spoken word and audiences had to be in the presence of the speaker or they missed his message. Once the message could be written, it could be stored and read later by anyone, at his or her convenience (p. 66).

In his survey, Dowdall (1996) also found that the majority of students preferred asynchronous interaction. He acknowledged that students were hesitant to call in while the class was on air as they apparently were shy or embarrassed to talk in front of the TV audience. This reluctance was, no doubt, exacerbated in his case as students saw themselves on the class monitors. Nahl (1993) also highlighted learner inhibition due to cameras taking a close-up shot of students' faces and projecting this onto screen as they soon as they indicated a willingness to talk. This self-consciousness is not applicable to the *TeleTuks Schools* context as no two-way video or multi-site linkage exists.

Having assessed all these attempts to define and characterise interaction, and agreeing with Reeves 's notion that learning can occur from a mediated communication episode, I use the term *interaction* as a functional - either observable or audible element of communication claiming that in a face-to-face situation, interaction only starts to occur once the recipient of the initial message responds to the message by returning another message. Interaction in this sense is thus the on-going meaningful exchange of messages described in communication science as the regenerative circuit or loop that completes interpersonal communication giving it a dynamic rather than linear nature. I distinguish between this cyclical process and the single, one-way verbal or non-verbal reply of the individual recipient to an exchange that I term, feedback. Interaction is thus a series of feedback actions. With this explanation in mind, I examine the ITV learning context in terms of the presenter as the sender or the initiator of the communication with the viewers as recipients of a structured message – the subject content. Regardless of instructional context, the ideal reaction, which follows such receipt, would be learner participation. It is not insignificant that the Latin root *participo* means *to share.* Although Rivers (1988) elucidates on classroom interaction, much of her description holds true for the ITV context as well:

> Interaction involves not just expression of one's own ideas but comprehension of those of others. One listens to others, one responds. Others listen and respond. Participants work out interpretations of these meanings though interaction, which is always understood in a context, physical or experiential with nonverbal, cues adding aspects of meaning beyond the verbal (p. 4).

In the context of the *TeleTuks Schools* project, presenters have accepted that interaction implies any audible learner-reaction to the instructional information *e.g.* asking or answering questions. This narrow definition borders on a behaviourist model where learners react to the presenter-initiated stimuli. Viewers establish audio communication via ordinary telephone lines and in some cases, small desktop microphones. Such a

traditional communication loop ought to be created easily, however synchronous vocal interaction between instructor and learner remains exceptionally low (on average, one learner response for every 25 broadcasts).

Nonverbal communication is an integral part of face-to-face interaction but not always evident in mediated communication. A fundamental difference between a face-to-face instructional experience and the *TeleTuks Schools* context is that existing technology only permits a bi-directional audio link, thus excluding all non-verbal cues the presenter may have used to gauge the effect of her communication. Corrective measures on the part of the presenter can only be made once audible feedback has been given. This feedback is also not immediate or spontaneous due to factors relating to the system design. Several noise-related issues were identified. The poor oral participation may reside in the Grade 12 learners' lack of proficiency in English – the language of instruction. Without a shared verbal code, interaction is limited and the semantic noise intrusive. It is within this framework of interaction and the influence of noise that I sought to make sense of the collected data.

2.5 Concluding remarks

The ITV studies I reviewed were generally comparative or pragmatic and addressed pedagogical issues related to distance education, especially those encountered when using ITV as a form of instructional technology. Most studies lacked methodological rigour and any empirical evidence was quantitative. Almost all made practical suggestions for increasing interaction but focussed on instructional design and technological issues rather than on communication obstacles. Furthermore, where reluctance to interact has been reported, it has not been examined in-depth but ascribed to embarrassment or technological gaucheness. The disjuncture between the language of instruction and the learners' primary language has also not been addressed. In addition, it would appear as though instructional television projects in the developing world are under-represented in the literature. I endeavour to ground my research in an explicit communcation framework and while many aspects of instructional television as documented in other studies, correlate with my personal ITV experience, my approach to studying the *TeleTuks Schools* case study differs in that I shall attempt to uncover possible reasons for low learner participation during televised instruction.

In this chapter, I have given an overview of recent literature pertaining to instructional television and have endeavoured to contextualise the *TeleTuks Schools* project within this review of the ITV domain. I have also outlined several communication models in order to provide the theoretically foundation of the study. I, moreover, defined and described interaction as a social process within instructional contexts, pointing out how my investigation would extend on existing thinking regarding learner participation during televised lessons. In the next chapter I discuss the methodological process of the inquiry and explain how I dealt with the research question empirically. The ensuing storyline acts as an explanatory framework within which I shall attempt to derive meaning from the primary data.