COMMUNICATION

Quantifying Interactive Learning

ANURAG SAXENA[1] and MONIKA JAUHARI[2]

[1]*Centre for Development of Evaluation Technology, SRED, IGNOU, India*

[2]*INSDOC, New Delhi, India*

Abstract *: Learning process in Distance Education begins with the development of "material" which helps the learners at a "distance" through some kind of "dialogue". In conventional set-up the learners go to a classroom and attend a lecture. The learning activity begins and ends there only. Distance education according to Moore depends upon "dialogue" and "structure". The actual distance between the learner and the teacher is nothing but the degree of dialogue and structure in them. This degree is represented as "distance continuum". Present paper defines "interaction scores" based on this distance continuum and thus tries to quantify the "media-package".*

Introduction

Distance Education is an outcome of fusion between diverse disciplines such as Planning, Education, Educational Psychology, Cognitive Science, Communications, Subject Expertise, Management and Administration. Distance Education thus has to depend on many specialists that contribute with the teacher to share the "teaching" responsibility. The fusion of efforts of all these persons results in development of "material" for the learning process to begin. Student then takes the responsibility and initiative for their learning and while learning, they are supported by the instructor at a "distance" through some kind of "dialogue" .

According to Parer (1995), quality in distance teaching is based on a well-structured design + dialogue and communication. These designs are based on Moore's (1973) three dimensional theories of distance education with learner dialogue and structure i.e. the learner is independent, he interacts with the instructor and element of course design thereby responds to his needs. Moore views highly structured programmes as more "distant" than low-structured programmes with high dialogue. According to Vogotsky (1978) learning is essentially dependent on dialogue and interaction. According to him, apart from the learner, the teacher, and the problem in a particular context and the knowledge to solve the problem are important factors to be looked upon. As distant educators our aim should be to fill the vacuum caused by the absence of the second factor i.e. the teacher by increasing the interactivity to such a level that the absence is

Indian Journal of Open Learning, 1999, 8(2), 163-169.
ISSN 0971-2690. Printed in India.

not felt by the learner while he is acquiring knowledge to solve a problem. Keegan (1996) highlighted two characteristics of distance education: firstly, quasi-permanent separation of teacher and learner and secondly, quasi-permanent absence of the learning group. Thus we have to focus on learner – content interaction. Our media package does try to enhance the learner-teacher interaction but definitely to a limited extent.

The present paper is an attempt to re-apply Moore's approach of "Structure" and "Dialogue" with the present set of communication technologies available and thus finding the most suited mode of delivery to enhance the interaction.

Moore's Concept and its Extension

In conventional set-up the learners go to a classroom and attend a lecture. The learning activity begins in the classroom and ends there only. According to Moore, distance education is essentially a form of independent study, is heavily dependent on two characteristics:

- Dialogue
- Individualisation (lack of structure)

"Dialogue" can be interpreted by the expression "academic interaction" aimed at effecting teaching and learning. In a classroom set-up, dialogue can take place with the "word of mouth" while in distance education it takes place by using communication technologies. Thus high dialogue is essentially minimisation of distance between the learner and the instructor. Whereas 'structure' can be interpreted as the high correlation between the components of curricula of programme and the learner. Moore (1989) classified interaction in context of open and distance education in three types leaner-content interaction, leaner-teacher interaction and leaner-learner interaction. Hillman et. al (1994) added a new kind of interaction i.e. interaction arising out of sojourn of the delivery media i.e. the communication technology used for interaction and the learner. According to them it is called learner-interface interaction. Learning can definitely be enhanced if one achieves learner interface interaction .

Distance: A Function of Dialogue and Structure

Various combinations of dialogue and structure can occur in different categories of an academic programme, Moore has categorised the possible educational programmes as follows.

Table 1 : Relation of distance with the type of programme

Distance as the variable	Type	Programme Type	Educational Programmes
Most distance	– D + S	no dialogue, with structure	Programme based on Radio/TV
	– D – S	no dialogue, no structure	Independent study programme of self directed type
	+ D + S	dialogue and structure	Programme with correspondence method
Least Distance	+ D – S	dialogue and no structure	A tutorial

Source : Adapted from Moore(1977)

Moore said that the actual distance between the learner and the teacher should not be mentioned by the spatial distance between the two but in the terms of degree of dialogue and structure between the two. Presented below is the degree of the two parameters. In the table below the modes are categorised according to the degree of dialogue and structure in them. They are rated by a scale, which according to Moore is called "distance continuum". The distance continuum is further restructured on a 10-point scale to give birth to "interaction score". The lower the interaction score, the higher is the interaction level.

Table 2 : Distance continuum of technologies

Mode	Type	Scale	Interaction score
Independent study in campus	D – S	1	0.77
Toll free individual telephone	D – S	2	1.54
Integrated multimedia (C A I)	D – S	3	2.30
Teleconferencing/home classroom	D – S	4	3.08
Individual correspondence	D – S	5	3.84
Group telephone	D + S	6	4.62
Group correspondence	D + S	7	5.39
On-line searches	– D – S	8	6.15
Programmed instruction (other than CA I)	– D – S	9	6.92
Dial access tape systems	– D – S	10	7.69
Television /video	– D + S	11	8.46
Radio/audio	– D + S	12	9.23
Textbook	– D + S	13	10

Bands

Once the weights have been defined, one can classify a media package according to the following score bands.

Score Bands	Distance Type	Outcome
0.00 to 4.00	Least distant	High dialogue, High individualisation
4.00 to 6.00	Less distant	High dialogue, Low individualisation
6.00 to 8.00	More distant	Low dialogue, High individualisation
8.00 to 10.00	Most distant	Low dialogue, Low individualisation

Entrance of communication technologies in the field of education is one of the biggest revolution of the present time. The drivers in the growth of this include the globalisation of education, worldwide telecom deregulation, technology development and convergence. The figure that follows shows some of the possible communication technologies in distance education. They are by no means exhaustive. One is compelled to believe that the best is yet to come. Bates (1995) has classified the technologies into one-way and two-way and media into face-to-face (F2F), text, audio and video. Appropriate communication technology is the one which is two-way i.e. allowing inter-personal communication and the one which uses or enables the learner to have a choice of media according to his own level of understanding and convenience.

Cases

Let us take four typical cases of media-mix .

Table 3 : Scores of four different media-mix

Communication Technology	Interaction score	Mean interaction score
Case I – Interaction very high		
Educational TV (audio/video)	8.46	
Toll-free telephone	1.54	
Teleconferencing	3.08	3.49
Home classroom	3.08	
Integrated multimedia	2.30	
Case II – Interaction high		
Computer assisted learning	2.30	
Integrated multimedia	2.30	
Toll free telephone	1.54	4.15
On-line searches	6.15	
Audio and video	8.46	
Case III – Interaction low		
Teleconferencing	3.08	
Television	8.46	6.89
Radio	9.23	
Case IV – Interaction very low		
Printed text only	10.00	10.00

As can be seen, the cases above are typical examples of four different bands. The prime objective of a distance education institute is to minimise the distance between the learner and the instructor. This is a factor that distinguishes distance education from the correspondence education. So, one should try to minimise the distance by keeping cost, access and user-friendliness in mind.

Implications for Enhancing Learner-Teacher Interaction

Chaudhary (1996) has highlighted some of the points for effective media usage. Table 4 shows a possible media combination i.e. the printed text remains the main mode of delivery that is backed by solving queries/ doubts/problems of students through telephone tutoring and thus having a lot of dialogue. Computer/audio conferencing further facilitates the dialogue and on special purposes, costly video conferencing is utilised. The management and development of educational processes and material are done on computer.

Table 4 : Possible usage of technology

Technology	Possible usage
Printed text	Main mode of delivery
Telephone tutoring	Clarify doubts/ problems/ queries of students, also, use for student support services
Computer/audio conferencing	To facilitate pedagogic dialogue with the students
Video conferencing	Used for training purposes, sophisticated purposes, for those who can pay
Computer /Integrated multimedia	Managing and developing the educational material and system.

The choice of using an appropriate communication technology depends on cost-effectiveness, efficiency, and suitability to socio- economic and educational conditions, accessibility, user friendliness and appropriateness. The technology that minimises the distance and which takes care of the interactions of the learner with various nodes.

Keeping in view the above discussions, one would like to have a media package that satisfies the above conditions i.e. it should minimise the distance, should be cost effective, should be user friendly and should adapt to local conditions. We hereby highlight four new communication technologies with higher score of interaction.

Table 5 : New media package for enhancing "interaction"

Common Technology	What needs to be done	Usage
Two-way audio Conferencing	Tariff rate of these services to be subsidised for educational purposes	Reaching far geographical distances, deliver quality instruction, guidance.
Multimedia (CD-ROMs)	Course material is developed on CD-ROMs. Efforts should be done to make it interactive	Because of computer boom in the country, multimedia is no more an uncommon thing. In IGNOU's case PALs/ PIs/MMLCs/ DLFs/Local work centres could provide the usage facilities.
LAN/WAN	Linking major educational institutions	A communion of expertise for research and training activities
Cable TV network (Both one-way / two-way)	Hiring services of big networks like Hinduja's City Cable	i. Increasing reach e.g. Zee Education ii. Tutoring and counselling

The above table highlights the usage of two-way audio conferencing. This is the easiest and quickest way of a dialogue between a distance learner and the instructor. Secondly, the future would belong to computer and multimedia technologies so developing / translating majority of our courses on CD-ROM's would become an essential exercise. Thirdly, open universities depend a lot on outside expertise for course-material preparation and other academic activities. Provision of LAN/ WAN between educational institutions would thus help in expediting the process. Lastly, since video teleconferencing has limitations of being used only at RC's, the idea of utilising Cable TV Network can seriously make us more accessible, like Zee Education.

IGNOU has recently initiated a media-mix based on Virtual Campus, learning interactions is one of the important aspect of virtual education . According to Pant (1999), the interactive learning model will cover 50% time through interactive technologies. Let us see how our method of quantifying the interaction level fares with the Virtual Campus Initiative. Through this initiative an attempt is made to use a variety of media and technology to meet all three kind of interactions propounded by Moore (1989). Learner interface interaction is also enhanced as there are two sessions based on laboratory and computer based training thus enabling the learner to have orientation, guidance on how to make the optimum and effective use of these technologies. Table 6 given below shows as to how virtual campus initiative has been able to remain very highly interactive. It has also been able to take care of learner-learner interaction and learner-interface interaction.

Table 6 : Virtual campus initiative and the "interaction"

Technology	Trimester			Interaction score	Weighted interaction score in the trimester		
	I	II	III		I	II	III
Live satellite based lectures	35%	25%	10%	3.08 (+D-S)	1.078	0.77	0.308
Recorded video lectures	5%	10%	5%	8.46 (-D+S)	0.423	0.846	0.423
Laboratory	35%	25%	20%	2.30 (+D-S)	0.805	0.575	0.46
Computer based training	5%	10%	10%	5.39 (+D+S)	0.2695	0.539	0.539
Internet learning resources	4%	5%	15%	6.15 (-D-S)	0.246	0.3075	0.9225
Internet chat with faculty	10%	15%	20%	0.77 (+D-S)	0.077	0.1155	0.154
Internet chat with peer group	4%	5%	10%	0.77 (+D-S)	0.0308	0.0385	0.077
Internet chat with external expert	2%	10%	10%	0.77 (+D-S)	0.0154	0.077	0.077
Total interaction score of each trimester					**2.94**	**3.27**	**2.96**

Summary

Educational planners have to rethink about their existing media package i.e. the combination of printed text supported by radio, TV, audio/video cassettes and teleconferencing. They have to switch over to a combination that makes them less 'distant' and more interactive, reduces the delivery cost and remains accessible to students.

Technology is fast changing and one should keep itself ready for upgradation. Internet has made the world a global village and unless one adapt to the pace of technology, he may fail to attract people. Lately, VSATs are becoming widely accepted as the datacom needs grow. Till now TDMA VSATs are being used for datacom needs with fewer channels for voice communications. DAMA VSATs for more voice channels and transmission of video on VSAT network, which will give a boost to video-conferencing is on cards. Newer technologies like wireless-in-local -loop and CDMA (Code Division Multiple Access) have become buzzwords in distance education circles.

We are moving towards what?

Probably the answer is, ***towards a convergence point of technologies.***

And What is that?

The answer is, ***towards a virtual reality i.e. a "virtual classroom".***

And finally, What is a virtual classroom?

The answer is, ***Where the distance is nil (or the interactivity is maximum)***

References

Bates, A.W. (1995) *Technology, Open Learning and Distance Education,* London: Routledge.

Chaudhary, S.V.S. (1996) New communication technology and open learning: Implication for education and training in India. *Report on ACU Development Fellowship* (Mimeograph).

Hillman, Daniel C.A.; Willis, Deborah J.P., and Gunawardena, Chalotte N. (1994) Learner interface interaction in distance education: An extension of contemporary models and strategies for practitioners, *American Journal of Distance Education,* 8(2), 30-42.

Holmberg, B. (1989) *Theory and Practice of Distance Education,* London: Routledge.

Keegan, D. (1996) *Foundations of Distance Education,* 3rd ed., London: Routledge.

Moore, M.G. (1977) A model of independent study, *Epistolodidaktika,* 6, 6-40.

Moore, M. G. (1989) Editorial: Three types of interaction, *The American Journal of Distance Education,* Vol. 3(2), 1-6.

Moore, M. G. (1973) Towards a theory of independent learning and teaching, *Journal of Higher Education,* 44, 661-679.

Pant, M.M. (1999) The Virtual Campus, *PC Quest,* May, 1999,158-160.

Parer, Michael S. (1993) *Educational Developers in Action — A Series of Tales from the Mud – Developing Open Courses,* Centre for distance learning, Monash Distance Education Centre, Australia.

Parer, Michael S. (1995) "Good distance teaching: quality distance teaching = structured design + dialogue + communication" , *One World Many Voices — Quality in Open and Distance Learning, Vol. 2, 17th World conference proceedings of ICDE,* Birmingham, U.K.

Vogotsky, L. (1978) *Mind in Society: Development of Higher Psychological Process,* Cambridge: Harvard University Press.

[**Dr. Anurag Saxena** is Deputy Director. *Correspondence:* Centre for Development of Evaluation Technology, Student Registration and Evaluation Division, IGNOU, New Delhi 110 068, India.]

[**Ms Monika Jauhar** is Student Associateship in Information Science. *Correspondence:* INSDOC, 14, Satsang Vihar, New Delhi 110067, India]