Electronic-Imen-Delphi (EID): An Online Conferencing Procedure

David Passig, Ph.D.
Aviva Sharbat, Mrs.
Bar-Ilan University, Israel

David Passig teaches Educational Futures, Systems Theory, and Virtual Reality at the School of Education, Bar-Ilan University, Israel.
E-mail: passig@mail.biu.ac.il

Web site: http://faculty.biu.ac.il./~passig

Aviva Sharbat is a Researcher in the Virtual Reality at the School of Education, Bar-Ilan University, Israel.
E-Mail: sharbata@mail.inter.net.il

Correspondence
Dr. David Passig
School of Education
Bar-Ilan University
52900 Ramat-Gan, Israel.

Tel: +972-9-8340 042
Fax: +972-3-535 3319
Cell: +972-52-782377

For the academic year of 1999-2000
1575 Tenaka Place V4
Sunnyvale, CA 94087 USA
Tel/fax: (408) 733 4210
Mobile: (408) 507 1036

Electronic-Imen-Delphi (EID): An Online Conferencing Procedure

ABSTRACT

This study examines the efficiency of the Imen-Delphi (ID) technique as an electronic procedure for conferencing. Originally the ID procedure (Passig 1993, 1996, 1997, 1998) was designed in order to facilitate a discussion among a group of panelists sharing a common future interest. The goal of the ID is to help the participants clarify their opinions and expectations regarding their preferable and possible futures. Thus, helping them commit themselves to the task of implementing the desirable agreed upon future. This study conducted an electronic version of the original ID procedure and tested its efficiency in reaching an agreement among a group of experts on Virtual Reality (VR) and Education.

KEY WORDS

On line, conference, Imen Delphi, Virtual Reality, education

INTRODUCTION

The ID procedure is a variant of the classical Delphi forecasting technique (Linstone & Turoff 1975, Woudenberg 1991). The classical Delphi technique is based on the assumption that group judgment of trends can enhance the validity of the forecast. This technique was developed by the RAND corporation in the early 1950's and was only made public a decade later in a project which was funded by the US Air Force (Brown 1968, Helmer 1966).

In contrast, the ID is based on the foundations of the Social Systems Theories (Bahg 1990), and relies upon the strengths of later versions of the Delphi technique. (Ranch 1979, Turoff 1975, Press 1983, Harkins & Kurth-Schai 1984, Poolpatarachewin 1980). The ID procedure was designed to develop shared future images among a group of people sharing a common future interest. Its main objective is to enable the group to efficiently cope with complex problems regarding their future and to establish a collective future mission. The ID procedure is geared to promote the responsibility and the self-awareness of the participants towards their probable and preferable future. The ID procedure, as opposed to the Delphi technique does not direct the participants to foresee future events. The procedure, instead, guides them towards general agreement and future growth. They are directed to reach one of the

following five types of agreement: total agreement, majority, bipolarity, partial agreement and total disagreement.

The ID procedure is based on three rounds with feedback.

1. In the first round, the researchers provide the participants with a number of "teasers" and ask them to draft questions around the teasers. The researchers later draft the first questionnaire from the collection of questions, which were received from the participants. The participants then receive the first-round questionnaire.
2. The second round includes a list of statements, which were drafted from among the answers of the participants to the first questionnaire. The participants are requested to organize their preferences, their desires and their vision regarding each of the statements.
3. In the third round, the participants receive a final list of agreed upon mission statements. This list is given to the participants to express their satisfaction with the present situation. They are also requested to draft recommendations for future implementation.

The facilitators carry out the three rounds and prevent the participants from direct confrontation during the procedure. The names of the participants are known to the group but their answers and remarks are kept anonymous. The assumption at the basis of the procedure is that anonymous interaction strengthens the credible representation of the participants' opinions, and that anonymous reactions are more genuine than those which can be publicly identified with their source. The anonymous answers do not become the object of influences, social pressure, irrelevant communication and fear of public disagreement on the part of the dominant participants (Kurth-Schai 1984).

ELECTRONIC CONFERENCING

The Electronic ID (EID) version was designed in order to enable the worldwide group of experts on VR and Ed to conduct a conference whose purpose was to reach an agreement regarding the future of VR in the curriculum.

The worldwide net infrastructures are steadily improving. Their costs aspire to become free of charge to all. Internet Service providers (ISP's) are beginning to offer free communications services to customers in exchange for a commitment to remain

with the provider for an agreed-upon period of time (San Jose Mercury News Sep. 13, 1999).

On the other hand, the net is chock-full with discussion groups and forums. It is becoming more and more difficult to identify the initial objective of the conversations taking place in them. Most of the discussions are casual and non-conclusive. Subscribers to chat groups in electronic mail listservs are familiar with the phenomenon of aimless questions and answers, which is common in the electronic world. This type of mail places a burden on the inbox until a loss of orientation from the hyper-talk occurs.

In contrast to the chat groups, personal electronic mail has indisputably achieved the most important status as the most authentic interpersonal conversations that take place via the network. However, even electronic mail has not succeeded in capturing a place in group-discussions with clearly defined goals. Still when a group of experts, scattered over all corners of the globe, is required to conduct an in-depth discussion after which operative decisions must be reached, they have no choice but to again turn to a forum on the network or to the old, expensive way—a convention in a hotel, with all its occurring expenses (Roschelle and Pea 1999).

This study, therefore, seeks to examine whether it is possible to enhance the efficiency of the discussions taking place on the network. This study wishes to harness the ID procedure for conducting group discussions on the net.

Conducting studies via electronic mail is not new. The literature contains to-do checklists in an effort to make the studies carried out by e-mail more efficient.

As early as the 1980’s, when e-mail was known only to Unix adherents, Moore (1987) detailed a list of ten steps in research conducted via regular mail, which were also suitable for studies conducted via e-mail:

1	The decision to conduct a questionnaire	Drafting the questionnaire
2	Selecting a group of participants.	Distribution to the questionnaire
3	Constructing the questionnaire	Sending reminders to participants
4	Mail administration with explanations and preliminary notices	Receiving the completed questionnaire
5	Constructing a preliminary test of the questionnaire	Analysis of the completed questionnaires

However, we have not found anything in the literature that reports on conducted structured group discussions by electronic mail. This study seeks to report, therefore, on such an endeavor and its results.

PROCEDURE

In this study, 50 participants (see table 1) from worldwide agencies, organization and academic institutes were provided with an opportunity to take part in a future oriented discussion about VR in education. This group of experts formed an ad-hoc virtual panel of people from around the globe. Most of the participants are holding key positions at universities, research institutes and the industry of educational VR. The scholars among them have conducted studies and published scientific papers and books. The participants were aware of the names of their colleagues in this panel, but the whole procedure was carried out anonymously.

We have collected a list of 116 experts who are working on different aspects of VR and education through various channels—from VR electronic news-groups to lists of participants in VR conferences. We have addressed them with the rational of the study and asked for their consent to participate in the panel. Fifty-three sent their consent to participate, 22 refused to participate, and the rest didn't answer. Finally, 50 worldwide experts took part in this electronic conference—15 women and 35 men.

Table 1: Participants

Expertise Country	Distinguished scholars	Industry developers	M.A & Ph.D. students working on educational VR
United States	17	6	4
Canada	1	-	-
United Kingdom	3	1	5
Germany	-	-	1
Switzerland	1	-	-
Austria	1	-	-
Greece	1	1	2
Australia	2	-	-
New Zealand	1	-	1
Singapore	-	-	1
Venezuela	1	-	-
Total = 50	28	8	14

The participants were asked to collect studies (teasers) regarding trends in two aspects of future educational VR: the *way* and the *reason* to integrate VR in schools—the *why* and *how* to make use of VR technologies in future curriculum (K-12). We have asked them to provide us with teasers, and we engaged also in collecting others. By *intellectual-teaser* we meant any kind of references, short summaries or excerpts (10 sentences) from original articles, studies, visionary notes or any other published information, concerning the future of VR in education, which correspond to the two aspects in debate—the *why* and *how.* It was necessary to provide the participants with a number of thought-provoking *intellectual teasers* to assist them in generating thoughtful questions to be addressed later to the whole panel.

ELECTRONIC SESSIONS

We then produced a file summarizing in it the variety of teasers submitted by the participants as well as the researchers (20 teasers on total) (see sample on fig.1). We have left space at the bottom of each teaser and asked the participants to draft questions for later presentation to the whole panel. The file was attached to an e-mail sent to the 50 participants.

The participants were kindly asked to:

1. Read the attached excerpts.
2. Imagine the other participants sitting in front of them reading the same material.
3. Imagine they had the opportunity to ask them questions on how they view the future of educational VR in light of the teasers they all had just read.
4. Think about questions that would extract images from the participants' minds and hearts concerning the future.
5. Challenge the participants' motivations and self-expectations.
6. Draft actual questions relevant to the participants' scope of communal issues.

FIRST ROUND

In a very real sense the causes of the present lie in the future, which means that the image of the future people have in their minds can have a dramatic effect on what they do right now. We have stressed that it is important to collectively learn and create complex images of the future, since on their basis it is possible to develop skills through which one may adapt to change and create change.

We then developed a second file in which we organized the questions (28 out of 413—clarifying, and combining the most relevant ones) around the two categories of future VR in education (for a sample of the first round questionnaire, see fig. 1).

The participants were asked to do the following:

1. To read the attached excerpts and projections.
2. To answer the questions briefly.
3. To enlarge upon their perspectives, notions and objectives in dealing with the issues.
4. To submit questions to the rest of the panel if they choose to do so.

Figure 1: Sample of a First-Round Questionnaire

The Why • SELF-DIRECTED LEARNING • Theory

The use of VR in education may encourage self directed learning in the student. Bruner (1968), Vygotskii (1978),and Piaget have emphasized the importance of self directed activity in their theories.

Brown, D. J, Mikropoulos, T. A, & Kerr, S.J. (1996) A Virtual Laser Physics Laboratory. VR in the Schools December 1996, Vol. 2: 3.

Questions to participants

8. How would you define VR in education?

_____

9. What should be the leading education theory in the development of VR educational material (if any)?

_____

SECOND ROUND

The underlying purpose of the second round was to facilitate a thorough online interaction that would generate specific ideas listed as statements. Therefore, the second-round questionnaires were designed around the proposed mission-statements. The statements that comprised the second-round were narrated by the researchers who organized the answers that were received from the first round in two reports coinciding with the original two categories in debate—the *why* and *how* VR in K-12. These reports were e-mailed to the participants. The second-round questionnaire was comprised of 72 suggested future mission statements (for a sample, see Table 2).

The purpose of this round was to help organize thoughts and focus the discussion around more specific solutions for 1) preferred futures, 2) expected futures, and 3) potential (or prospective) futures. The Imen-Delphi procedure is aimed at producing some type of agreement on an alternative future mission: complete disagreement,

plurality, bipolarity, majority, or complete consensus. The second round was designed to achieve that purpose (for a sample, see table 2).

Table 2: Sample of a Second-Round Questionnaire

Statements	Question I Do you prefer this statement to be fulfilled in the future? A. Definitely yes B. Possibly yes C. Probably no D. Absolutely no	Question II What is the likelihood that this statement will be applied in the future? A. Certain B. Uncertain C. Probable D. Unprobable	Question III Is this statement feasible to be realized in the future? A. Certain B. Uncertain C. Probable D. Unprobable
8. Ed. VR will provide learning experience different from other media			
9. We will be able to evaluate Ed. VR learning experience using some of the same parameters as the ones used to measure the 'old' experiences.			

THIRD ROUND

The list of mission-statements that comprised the third round was adapted from the mission-statements of the second round that received the majority vote as being *very important goals* for the future of VR in education. The purpose of the third round was to have the panelists take responsibility, formulate a final proposed list of future mission-statements, and generate new ideas and recommendations. The third round questionnaire comprised a final list of 46 agreed upon future mission statements. The following (see Table. 3) is a sample from the complete list that the majority of the participants accepted to represent the preferred points of a future mission of VR in education.

Table 3: Sample of the Third-Round Questionnaire

		icipants' votes on mportance of this ement to the future? Definitely yes Possibly yes Probably not Absolutely not (from 2nd round)	Please mark whether or not you are satisfied with the way Ed. nowadays uses the potential of VR expressed in each of these statements y/n	Please, give any suggestions as to how we can promote the implementation of these statements in future VR and Ed.
1.	VR in ed. have to be defined as a computer-generated space which provides sensory immersion using 3-D interactive multi-user worlds and application of virtual environments for learning.	A. 45% B. 41% C. 5% D. 5%		
2.	VR in ed. will have to provide the students with an opportunity to experience sensory interactive learning environments that will enable them to move from passive learning to active learning.	A. 82% B. 18% C. 0% D. 0%		

EVALUATION

At the end of the procedure an additional round was held in which we examined the procedure itself. The questionnaire for evaluating the procedure was drafted in order to examine whether communication between the facilitators and the participants was clear and unfettered, whether the steps which were taken in the procedure were logical to the participants and whether the participants understood the purpose of the discussion and the research procedure? The evaluation questionnaire was also sent to all the participants by e-mail. The following (Tables 4-10) are the evaluation questionnaires.

Table 4: Preliminary Round

		1 Highly agree	2	3 %	4	5 Total disagreement
1.	After submitting my consent to participate in this research I received clear explanatory materials about the procedure by e-mail.	93	7			
2.	The explanation of the theoretical foundation of the EID helped me in following the directions of this procedure.	60	20	13	7	
3.	The use of e-mail encouraged me to answer quickly and promptly.	67	13	13	7	
4.	The use of e-mail in this research made the participation easier for me.	93				7
5.	The files that were attached to the e-mail letters were well arranged, clear, easy to understand and convenient to work with.	53	33	7		7

Table 5: Teasers

		1 Highly agree	2	3 %	4	5 Total disagreement
6.	I could contribute to the bank of intellectual teasers, since the researcher defined the notion of an intellectual teaser in a clear and straightforward way.	47	27	7		
7.	The teasers sent to me in the preliminary round were thought provoking and helped me to generate diverse, and interesting questions.	53	27	13		
8.	The teasers were relevant to the fields of VR in education and covered most of the main issues.	47	40	7		

Table 6: First Round

		1 Highly agree	2	3 %	4	5 Total disagreement
9.	The first round questionnaire assisted me to clarify my concerns about the future complex problems of VR in education.	20	33	33	7	
10.	The first round questionnaire helped me present my viewpoints, my perspectives and my notions concerning the uses of VR in education.	60	33			

Table 7: Second Round

		1 Highly agree	2	3 %	4	5 Total disagreement
11.	The mission statement list in the second round reflected my answers to the first round questionnaire.	40	20	20	13	
12.	The mission-statements drafted by the researchers were well focused on the main issues of the debate.	40	40	20		
13.	In the second round I could organize my thoughts and focus them around 1) preferred futures, 2) expected futures, and 3) potential (or prospective) futures of VR in education.	33	33	20		

Table 8: Third Round

	1 Highly agree	2	3 %	4	5 Total disagreement
14. The final list of agreed upon future mission statements is desirable as well as possible.	27	40	20	7	
15. Drafting suggestions on how to implement VR in Ed. should be required from the panelists in the third round.	60	27	7		
16. The third round suggested a list of agreed upon future mission statements that reflected my opinions about VR in education.	33	40	13	7	
17. The third round helped me realize the needs and aspirations of this group of experts.	27	47	7	7	7
18. The third round helped me focus on my satisfaction of using VR in education nowadays and think of operative ways to fulfill its potential.	27	20	27	13	7
19. The third round helped me search for solutions to future problems.	27	33	13	13	7

Table 9: Aims

	1 Highly agree	2	3 %	4 Total disagreement	5
20. Anonymity helped me avoid the fear of disagreement and public pressure, and thus elicited more honest responses from me.	20	7	13	33	27
21. The goal of this research was to facilitate a discussion with a group of worldwide VR scholars and developers.	60	20	7	13	
22. One of the reasons for this study was to express new ideas regarding a preferred future pedagogic paradigm in using VR in education.	60	33	7		

Table 10: Overall Conferencing Procedure	1 Highly agree	2	3 %	4	5 Total disagreement
23. The EID procedure helped me clarify to myself the potential of the future of VR in education.	27	27	33	7	7
24. The EID procedure helped me create images of the future and new ideas concerning VR in education.	27	40	20	7	7
25. The coherence among all parts of the research was clear to me.	53	40		7	
26. The EID procedure with 3 rounds of questionnaires was well structured and its goals were clear.	53	27	13	7	
27. The method of questionnaires and mission statements clarified effectively the issue on debate.	33	60	7		
28. This research facilitated the representation of my opinions, perceptions, insights, thoughts, ideas, feelings, and intuitions about the future of VR in education.	33	53	7	7	
29. I enjoyed taking part in this Electronic Conference.	67	13	20		
30. This research can influence VR developers in future education.	40	40	20		

From the replies of the participants, it is possible to conclude that EID successfully achieved its objectives according to which it was designated, and that it provides a growth experience for most of the participants, no less than the same procedure carried out in a physical setting (Passig 1998). On the basis of the future mission statements that were proposed by the participants and the quality of the recommendations they offered (a full list of mission statements and recommendations can be accessed at http://users.hub.ofthe.net/~mtalkmit/EdVRdirections.htm), it appears that this procedure has the ability to improve the approach of the participants towards reaching operative, qualitative, well-organized and clearly focused future solutions through the net.

DISCUSSION

Some of the steps which were formulated by Moore (1987) and mentioned above, are also reiterated in the EID procedure, mainly because the procedure is based on rounds which repeat themselves. In addition, an electronic conference that conducts a goal-oriented group discussion presents other challenges that do not exist in interpersonal electronic mail. Following are a number of challenges that we have encountered during the EID procedure:

1. There was a need for the simplification of the discussions in English so that the material would be clear to all participants.

2. There was a need for a careful drafting of the appendices attached to the letters, which were sent to the participants for a number of reasons:

a. Not all electronic mail software allows for the writing of a stylized text. Therefore, it was necessary to prepare attached appendices written in MS Word in order to draft the materials for the benefit of the reader's eyes.

b. The size of the electronic mailbox is usually limited to 3-5 Mb by the provider of the internet services (ISP). Therefore, it was necessary to prepare attached appendices no larger than 1-2 Mb in order not to clog the mailboxes of the participants.

c. Broadband Internet Access (DSL, Digital Cable, etc. 128K-10 Mbs) is still not available to most of the participants. Most of them still use home modems whose speed reaches a maximum of 56 Kbs. Therefore extra caution was necessary in drafting documents whose size does not require much downloading time.

3. It was necessary to purchase various types of electronic mail software in order to carefully deal with the different kinds of e-mail which were received from the participants such as: Outlook Express, Eudora, Exchange, etc. or with various formats such as in HTML, etc.

4. It was necessary to take into consideration the platforms of the computers used by the participants: Unix Based Hardware, Next, Macintosh and compatible PC's.

5. Special attention was required in writing the documents in a format which would make it easy for the participants to convert it to the word processor of their choice, such as: Claris 5, Claris Works, MS-Word 6.0, Corel WordPerfect, etc.

Even so, electronic mail proved to be very effective in establishing contact between the panelists. It created rapid, fluent, immediate, direct and concise communication between the participants and the researchers. Although the participants' replies were anonymous, it was apparent that ad-hoc contacts and informal private conversations

took place, with personal touches, as happens in physical conferences. Following are a number of phenomena, which we noted during the electronic discussions:

- Informal reactions by participants
- Hints and winks as in a face-to-face conversation
- Use of symbols (icons, smilies, etc.) in order to express feelings such as: capital letters, exclamation points, question marks, dots, underlining, sketched smiley faces, and even songs or musical files.
- Apologies for lateness, with explanations and sharing of personal problems.
- Asking questions for clarification.
- Constructive, supportive, critical and complimentary comments and suggestions.
- Expression of opinions on the structure, the content, the concept, the language, the verbal format, the philosophies and scientific and non-scientific theories.

In addition, the electronic conference created noteworthy anecdotes. Here are a number of them:

- Letters that were sent at midnight on a specific date that received answers and reactions from alert participants from the Western Hemisphere, were postmarked before the date the original letter was sent out.
- Letters sent from countries in the Eastern Hemisphere, such as New Zealand or Australia, which were postmarked at the hour of noon, were received by the researchers in the morning of the same day, that is to say, as though they were received before they were sent. The phenomena resulted in a situation in which in the mailboxes which the researchers set up for each participant, in which letters were arranged by subject and date, sometimes the replies by the participant appeared before the letters sent to them by the researchers.
- Especially interesting were the participants who requested, and received permission, to publicize intermediary results of the study in their web site. Here are some of the links:

  http://eastnet.educ.ecu.edu/vr/other.htm
  http://users.hub.ofthe.net/~mtalkmit/EdVRdirections.htm
  http://faculty.biu.ac.il/~passig/abstractSharbat.htm

SUMMARY

The Internet makes possible not only communication which is more rapid, but also more intensive and multi-dimensional. The human race will have to develop more complex and creative communication procedures in order to take better advantage of the potential contained in this vehicle. As with every new means of communication, humankind initially seeks, for the most part, ways in which to utilize it to improve communication, as s/he knows it. In time, s/he discovers new dimensions of

communication. This study starts with the assumption that electronic mail contains dimensions deeper than those who are apparent in the net.

This study sought to examine whether it is possible to conduct an international electronic conference via e-mail. The study found that when a group of experts scattered throughout the world is requested to conduct an in-depth discussion, which will result in operative decisions, it is possible to harness one of the procedures of conducting a group discussion – ID, electronically. The study also found that the use of the EID version increases the efficiency of the discussions carried on via the network.

REFERENCES

Bahg, C. (1990). Major Systems Theories throughout the World.*Behavioral Science. 35:2,* April (PP 79-107)

Brown, B. (1968). *Delphi Process: A Methodology Used for the Elicitation of Opinions of Experts.* The RAND Corporation, Santa Monica.

Harkins, A. & Kurth-Schai, R. (1983). OSCAR: An Applied Social Technology Variant of the Delphi Method. *Futureics. 7*(3, 1-7).

Helmer, O. (1966). *The Delphi Method for Systematical Judgements about the Future*. University of California.

Kurth-Schai, R. (1984). *Reflections from the Hearts and Minds of Children: A Delphi Study of Children's Personal, Global, and Spiritual Images of the Future*. Ph.D. Dissertation, University of Minnesota.

Linstone & Turoff (1975). *The Delphi Method: Techniques and Applications*. London: Linstone & Turoff (Eds) Addison-Wesley Publishing Company.

Moore, C. M. (1987). *Group Techniques for Idea Building.* Newbury Park, CA: SAGE Publications, Inc.

Passig, D. (1993). *Reactions to Experts' Forecasts by a Group of Jewish Teenagers: An Imen-Delphi Exercise - An Applied Social Methodology - A Variant of the Delphi-Forecasting-Technique*. Ph.D. Dissertation, University of Minnesota.

Passig, D. (1996). *Developing Communal Future Jewish Imagery with a Group of Teenagers. Journal of Jewish Communal Services*. A publication of the Jewish Communal Service Association. Kendall Park, NJ. 72(3), 210-216.

Passig, D. (1997). Imen-Delphi: A Delphi Variant Procedure for Emergence. *Human Organization.* The Society for Applied Anthropology, 56(1), 53-63.

Passig, David (1998). An applied Social Systems Procedure for Generating Purposive Sound Futures. *Systems Research and Behavioral Science*. The Official Journal of the International Federation for Systems Research. Wiley & Sons. West Sussex, England. Winter 1998. Vol. 14:1 (67-78).

Poolpatarachewin, C. (1980). Ethnographic Delphi Futures Research: Thai University Pilot Project. *Journal of Cultural and Educational Futures.* 2(4, 11-19).

Press, S. J. (1983). *Multivariate Group Assessment of Probabilities of Nuclear War.* (Technical Report #121). Riverside: University of Clifornia, Riverside, Department of Statistics.

Ranch, W. (1979). The Decision Delphi. *Technological Forecasting and Social Change. 15*(3):159-169.

Roschelle, J. and Pea, R. (1999) Trajectories from today's WWW to a powerful educational infrastructure. *Educational Researcher*. June-July 1999, pp. 22-25.

SAN JOSE MERCURY NEWS (1999) More companies offer free access: why pay for Internet service. Published on 09/13/99 Article 2 of 277, Article ID: 9909140054

Turoff, M. (1975). *The Policy Delphi: Delphi Method - Techniques and Applications.* Linstone & Turoff, Eds. London: Addison-Wesley Publishing Company.

Woudenberg, F. (1991). An Evaluation of Delphi. *Technological Forecasting and Social Change, Vol. 40*, pp. 131-150.