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Instructional dialogue: distance education students' dialogic behaviour

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Instructional systems, both distance education and campus-based, may be viewed in terms of intrapersonal and interpersonal *instructional dialogues*, that mediate and facilitate learning respectively, and *instructional resources* that enable such dialogues. Resources include self-instruction texts, tutorials, instructor availability, websites and more. This study investigated the dialogic behaviour of 521 Open University of Israel students as they studied undergraduate courses in Exact and Natural Sciences, Social Sciences and Humanities. Research objectives were to document what dialogue types, mediated through which resources, were utilized by students to overcome conceptual difficulty while reading instructional texts and while working on assignments. Two main findings emerged: (1) initially, most students dealt with both kinds of conceptual difficulty individually, on their own; only when such efforts failed did they turn to interpersonal dialogue; and (2) most students turned to peers for help, not to their instructors. These findings conflict with the assumed importance often ascribed to interpersonal, instructor–student dialogue by some distance education theorists.

Introduction

This article explores accounts of the process of distance learning by focusing on the instructional dialogues and resources utilized by university students. Modern distance education systems include a diverse array of resources for individual study (intrapersonal dialogue), such as self-instruction texts, tutorials and web-based instructional systems. In addition, there are different resources for interpersonal dialogue, such as telephone, email, face-to-face meetings with peers and instructors, and websites for synchronous and asynchronous interaction. Given this diversity, we investigated students' study strategies and practices in terms of the kinds of dialogues they engaged in and the resources that enabled these dialogues. To carry out such an analysis, however, a need exists for a broad conceptual framework of distance education systems that recognizes the centrality of instructional dialogue.

Such a framework originated as a theory of distance education (Gorsky & Caspi, 2005) and later developed into a unified theory of instruction (Gorsky *et al.*, 2007).

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Empirical support for the theory was found in a series of three preliminary naturalistic studies that tracked distance and campus-based students' dialogic behaviour as they learned physics and chemistry (Gorsky *et al.*, 2004a, b, 2006). Several findings emerged from these studies.

First, it was found that *all* learning activities engaged in by students could be categorized as dialogues enabled by some structural or human resource. Second, a general approach to the use of dialogue was discerned. For all students participating in these studies, *intrapersonal* dialogue (individual study) was the primary mode. This finding is supported by several other research studies, such as those by Rourke *et al.* (1999) and Rourke & Anderson (2002). Distance students learned primarily by reading self-instruction texts and by listening at tutorials; university students participating in large, lecture-based courses (in the study cited above, group size was about 150 students per lecture) learned primarily by listening at lectures and tutorials. Even though tutorials were more interactive than lectures, they constituted only 20% of total instruction time.

Third, both distance and campus-based students opted for interpersonal dialogue only when assigned problems that they could not solve. Fourth, for all students, the first partner chosen for interpersonal dialogue was a fellow student. Instructor–student dialogues were generally used as a last resort. Fifth, and last, only for campus-based students participating in small introductory-level courses (about 10 registered students) was interpersonal dialogue a significant mode engaged in while learning in the classroom. These findings are, to say the least, not surprising. What we believe important, however, is that these unsurprising and familiar findings may be grounded in theory.

The goal of the present research is to validate some of these findings by using a relatively large sample population of students and relevant statistical procedures. The research adopted a grounded theory approach (Glaser & Strauss, 1967; Glaser, 1978; Cohen & Manion, 1989; Charmaz, 1995; Strauss & Corbin, 1998) that begins with small naturalistic studies, carried out in order to generate models and hypotheses that can then be tested on larger populations using statistics. Taber (2000) wrote that 'grounded theory may be used to bridge between case studies and large-scale surveys, which enables the strengths of both to be combined in the same research programme' (p. 470).

Specifically, we will investigate how students from various disciplines deal with conceptual difficulty while learning and while working on assignments. This will be done by investigating the kinds of dialogues they engaged in and the resources that enabled them. In order to proceed, a brief review follows of what will be henceforth referred to as the Unified Theory of Instruction or UTI.

The unified theory of instruction

The theory consists of two propositions based on five underlying assumptions. The propositions are: first, every element in an instructional system is *either* a dialogue *or* a resource which supports dialogue, and second, dialogues and learning outcomes are correlated. The assumptions are:

1. Instruction is a set of purposeful activities directed toward achieving learning.
2. Learning is an individual activity characterized by internal mental processes.
3. Learning is *mediated* by intrapersonal dialogue.
4. Learning is *facilitated* by interpersonal dialogue.
5. Dialogue is enabled by structural and human resources.

The differences between intra- and interpersonal dialogues are especially important for the current discussion. Intrapersonal dialogue is defined formally as the interaction between student and subject matter as the student is purposefully trying to learn. Intrapersonal dialogue *mediates* learning (Gorsky & Caspi, 2005, 2007). When students read books or text from computer screens, listen to lectures or to interpersonal dialogues engaged in by others, use computer simulations or watch educational television, with the intent to learn, they are said to be engaging in intrapersonal dialogue.

The interaction between student and subject matter has generally been assigned a key position in all twentieth-century inquiry into human learning, be it from behaviourist, cognitivist or constructivist viewpoints. The internal mental processes that presumably occur have been labelled 'internalizing the consequences of behavior' (Skinner, 1968), 'assimilation' or 'accommodation' (Piaget, 1970), 'accretion', 'structuring' or 'tuning' (Rumelhart & Norman, 1978), 'intra-psychological processes' (Vygotsky, 1978), 'internal didactic conversations' (Holmberg, 1989) and 'self-instruction' (Gagne *et al.,* 1992). These internal processes are *not* relevant to the construct intrapersonal dialogue in the UTI, which records only the variables associated with the student/subject matter interaction (number of occurrences, duration, learning outcomes, etc.), but they are most certainly relevant to learning theory and to learning theorists.

Interpersonal dialogue is defined formally as the interaction between instructor and student, or between student and student. It may be face to face or mediated by communications media; if mediated, synchronous or asynchronous (Gorsky & Caspi, 2005, Gorsky *et al.,* 2007). Interpersonal dialogue is defined structurally as a message loop between Instructor–Student–Instructor *or* Student–Instructor–Student *or* Student A–Student B–Student A. Students may, of course, engage in dialogues with significant others, such as parents, non-university friends or employers. These human resources are excluded since they are beyond the domain of instructional systems. Interpersonal dialogue has two distinct classes of outputs: subject-matter oriented and non-subject-matter oriented. One or both types may characterize a message.

Instructional *resources* fall into one of two categories: structural or human. Structural resources for intrapersonal dialogues include all instructional materials of any kind specifically and intentionally made available to students: for example, texts or Internet sites. Earlier studies found that three structural resources influence the extent of interpersonal dialogue to a large degree: instructional design (Clark, 1983; Draper *et al.*, 1994; Gorsky *et al.*, 2004b), group size (Chen & Willits, 1998; Caspi *et al.*, 2003), and student and instructor availability (Chen, 2001a, b; Gorsky *et al.*, 2004a, b).

The most significant human resource in intrapersonal dialogue is the student. Each individual learner is characterized by a constellation of variables that include his or

her goals for the course, prior knowledge, motivation, autonomy, intelligence and anxiety, among others. These variables differ for each learner and they determine the extent of intrapersonal dialogue that occurs and its quality (Gorsky & Caspi, 2005).

Human resources for interpersonal dialogues are instructors and other students. Instructors' personality traits and facilitation skills play a critical role in creating and maintaining dialogue with students. Of particular importance is their approach to teaching (Kember, 1997; Prosser *et al.*, 1994), which has been shown to affect students' involvement in interpersonal dialogue. A teacher-centred, content-oriented approach decreases opportunities for interpersonal dialogue, while a student-centred, learning-oriented approach may increase such opportunities.

Methodology

Objectives

This study tested the models of students' dialogic behaviour that emerged from the naturalistic studies described. In addition, correlations between some human and structural resources that characterize courses taught at the Open University of Israel (OUI) and students' dialogic behaviour were sought. This study, which relied on a much larger population ($n = 521$) than those sampled in the previous naturalistic ones ($8 \leq n \leq 16$), enabled the use of quantitative statistical procedures.

Research objectives were to document: (1) what dialogue types, enabled through which structural resources, were specifically utilized by students to overcome a conceptual difficulty encountered while reading texts; (2) what dialogue types, enabled through which resources, were utilized by students while working on a difficult mandatory assignment; (3) what relationships exist between students' dialogic behaviour and selected structural and human resources common to the different courses; and (4) who is the first partner students turn to when they engage in interpersonal dialogue.

Structural resources associated with courses included class size, number of face-to-face tutorials, number of mandatory assignments, the discipline to which the course belongs and the perceived activity of the course website. Human resources included faculty and students. Attributes associated with faculty were coordinator and instructor availability and their approaches to teaching as perceived by students. Attributes associated with students included their reported prior grades, prior acquaintance with other registered students, assessment of course difficulty, motivation to achieve a high grade and self-perceived individuality.

Background

The Open University of Israel is a distance education university designed to offer academic studies to students throughout Israel. For more than 30 years the university has offered a home study system based on textbooks, tutors and study centres. This year's enrolment is more than 38,000 students.

Each course has a coordinator who is responsible for all administrative and academic activities, such as approving deferrals and writing assignments and tests, and instructors who lead tutorials. Tutorials may be 'regular', held every two or three weeks, or 'extended', held weekly. In addition, instructors and coordinators are available for telephone consultations at specified days and times. The text-instructor system was enriched in 1999 with the introduction of a web-based instructional environment, wherein each course has its own website. Course sites are intended to simplify organizational procedures and to enrich students' learning opportunities and experiences. Website use is optional and non-mandatory, so that equality among students is preserved. The website does not replace textbooks or face-to-face tutorial sessions, which are the pedagogical foundations of the Open University. It enables asynchronous instructor–student and student–student interactions.

Participants

A web-based questionnaire was distributed via email to 3512 students whose names appeared on the mailing lists of 11 courses. In total, 521 questionnaires were returned. Two points are noteworthy. First, mailing lists contained the email addresses only of those students who chose to be included. In other words, the sample population for the study is not representative of the entire student body at the OUI, in that it includes only students who have computers and access to the Internet. However, about 70% of the entire OUI student body does have computers and access to the Internet. Second, the 11 courses were selected only as a way to reach participants; that is, students were free to analyze *any* course they chose, not necessarily the courses from which their names were selected.

Mean age was 27.8 (range: 15–62). Men accounted for 48.8% of the participants.

Faculty distribution for the reported courses was: 73.1% social sciences, 9.1% natural sciences, 8.2% computer sciences, 7.6% mathematics and 2.0 % humanities.

Course size (number of registered students per course) ranged between 7 and 2600. Some 19.1% of the students attended 'regular' (up to 7) face-to-face tutorial sessions, while 79.6% attended 'extended' (8–15) sessions; 1.4% reported not attending tutorials. These sample distributions closely match the overall distributions for OUI students regarding age, gender, faculty, course size and tutorial type.

Questionnaire

After marking their gender and age, students selected a course they had already completed or that was now being studied. They were informed that all questions were related *only* to this specific course. Four questions related to the course's structural resources:

a. How many obligatory exercises were assigned in this course?
b. Did you attend regular or extended tutorial sessions or not at all?

c. Was the course's website active (i.e. updated at least once a week, or new messages are added to the course discussion group at least twice a week)?
d. Approximately how many students attended tutorial sessions?

Three questions related to faculty resources:

a. Was it possible to call the instructor beyond his or her consulting hours?
b. Was it possible to call the course coordinator beyond his or her consulting hours?
c. Describe the instructor's approach to teaching:
    ● The instructor primarily engages in the transfer of information.
    ● The instructor primarily meets students' needs and helps them to become independent learners.

Seven questions related to the students themselves:

a. Rate your motivation to achieve a high grade as high, moderate or low.
b. Rate the course as difficult, moderate or easy.
c. What is your current grade point average?
d. How did you prefer to learn, alone or with others?
e. How did you overcome a specific conceptual difficulty that occurred while reading the self-instruction texts? Mark *all* actions undertaken:
    ● reread the material
    ● contact a student from the same course
    ● contact the instructor
    ● contact the course coordinator
    ● enter the course website
    ● post a question in the course forum
    ● ask a question at the next tutorial meeting
    ● give up
    ● enter any other additional actions taken.
f. List the order in which the first four actions were carried out.
g. How did you deal with a specific difficulty that occurred while working on a mandatory assignment? Mark all actions undertaken (the list is identical to the one above).
h. List the order in which the first four actions were carried out.

Construct validity was ascertained by an evaluation made by five course coordinators.

Statistical procedures

For the first two research questions (how students overcome conceptual difficulty encountered while reading texts and while working on difficult assignments), a two-step procedure was carried out. In step one, correlations between students' dialogic behaviour and relevant human and structural resources were calculated. Since these variables are nominal, correlations were performed using Cramer's V procedure. When continuous variables were involved (e.g. the number of students in a tutorial), the eta correlation (η) was used.

In step two, those resources that correlated significantly with students' dialogic behaviour were entered into a forward stepwise multinomial logistic regression. The forward stepwise method is suitable for exploratory studies, wherein the contribution of each predictor is not known, either theoretically or empirically. Multinomial logistic regressions are used when dependent variables are nominal. Like linear regressions, logistic regressions can be used to predict the occurrence of a dependent variable given certain independent variables; furthermore, logistic regressions can determine the per cent of variance in the dependent variables seen as a function of the independent ones. The logistic regression estimates the probability that a certain event (a given nominal dependent variable) occurs by transforming a dependent variable into a logit variable (the natural log of the odds for the occurrence or non-occurrence of the dependent variable).

Steps one and two were also carried out for predicting the first selected partner for interpersonal dialogue.

Results

Students' dialogic behaviour

Students' dialogic behaviour was investigated in two specific cases: first, how they dealt with a specific conceptual difficulty that occurred while reading instructional texts, and second, how they dealt with a specific difficulty that occurred while working on an assignment. Five distinct dialogic behaviour patterns were identified:

1. intrapersonal dialogue only
2. first intrapersonal dialogue then interpersonal dialogue
3. interpersonal dialogue only
4. first interpersonal dialogue then intrapersonal dialogue
5. multidirectional: students who fluctuate between the two dialogue types.

Table 1 presents the distribution of the dialogic behaviour patterns as reported by the students.

Table 1.   Dialogic behaviour patterns (as percentages of total) for dealing with a conceptual difficulty while reading and while solving a very difficult assignment

	Assignment	Intra only ($n = 74$)	Inter only ($n = 24$)	Intra to inter ($n = 280$)	Inter to intra ($n = 15$)	Multi-directional ($n = 100$)
Reading	Intra only ($n = 85$)	10.5	0.8	4.5	0.0	1.4
	Inter only ($n = 12$)	0.0	1.4	0.8	0.0	0.2
	Intra to inter ($n = 292$)	4.1	2.0	43.8	1.4	7.9
	Inter to intra ($n = 22$)	0.2	0.2	1.4	1.4	1.2
	Multi-directional ($n = 82$)	0.2	0.4	6.3	0.2	9.5

Note: Some students left some questions unanswered, therefore the total numbers do not add up to 521.

In both cases, dealing with conceptual difficulty while reading and while working on an assignment, the majority of students began with intrapersonal dialogue and then switched to interpersonal dialogue (59.2% for 'reading' and 56.8% for 'assignment'). Cramer's V correlation between reading and assignment was .75 ($p < .001$) and indicated a consistency of dialogic behaviour in both cases.

Correlating students' dialogic behaviour with human and structural resources

Students' dialogic behaviour for each of the cases (overcoming conceptual difficulty while reading and while working on an assignment) was correlated with the system's human and structural resources. Table 2 summarizes the findings.

    The strongest significant correlation found was between a student preference to work alone ('individuality') and dialogic behaviour. In order to clarify this correlation, an additional test was carried out. Frequency distributions for each of the two groups (those who cited a preference to work alone and those who did not) were performed. It was found that 'individualists' generally exhibited two kinds of dialogic behaviour:

Table 2.   Cramer's V correlations of students' dialogic behaviour and the system's structural and human resources. Number of respondents range between 421 and 507 (some students left some questions unanswered)

Resources		'Reading'	'Assignment'
Structural	Academic discipline	.14	.12
	Number of registered students for the course	.31[+]	.31[+]
	Tutorial type	.14**	.14**
	Approx. number of students per tutorial (range: 1–60)	.24[+]	.29[+]
	Number of required assignments (range: 0–20)	.23[+]	.18[+]
	Perceived site activity (90% active, 10% inactive)	.05	.14*
Human: staff related	Instructor availability (62.1% more than required, 37.9% as required)	.16*	.11
	Coordinator availability (42.3% more than required, 57.7% as required)	.11	.06
	Teaching approach (70.3% content-centred, 29.7% learning-centred)	.06	.04
Human: student related	Prior acquaintance with other students (38.2% yes, 61.1% no)	.14*	.23**
	Motivation for high grade (77.3% high, 18.8% moderate, 3.9% low)	.10	.07
	Perceived difficulty (57.0% difficult, 36.3% moderate, 6.8% easy)	.11*	.12*
	Current grade point average (5.9% less than 70, 37.7% 70–80, 41.4% 80–90, 15.1% more than 90)	.07	.09
	Individuality (76.1% prefer learning alone, 23.9% prefer learning with others)	.36**	.29**

[+] eta correlation; the route is the dependent variable; correlations were not significant.
* $p < .05$; ** $p < .01$.

intrapersonal only and intrapersonal then interpersonal. Non-individualists also generally exhibited the intrapersonal then interpersonal behaviour, but instead of intrapersonal only, their dialogic behaviour was multidirectional.

A second significant correlation found was between students' prior acquaintance with other students and their choice of dialogic behaviour. That is, students who had a prior acquaintance with other students tended to utilize interpersonal dialogue to a greater extent than did students without any prior acquaintance.

Next, in order to examine which factor contributed more to students' dialogic behaviour, those factors that correlated significantly with students' dialogic behaviour patterns for overcoming conceptual difficulty while reading texts (tutorial type, prior acquaintance with other students, perceived course difficulty, and individuality) were entered into a multinomial logistic regression. A forward stepwise method was used, with the most common pattern, intrapersonal then interpersonal dialogue, as the reference category. Parameter estimates are presented in Table 3. The same statistical procedure was carried out for those factors that correlated significantly with students' dialogic behaviour patterns while working on a difficult assignment. Parameter estimates for this analysis are presented in Table 4. Two additional dialogic behaviours, interpersonal only and interpersonal then intrapersonal, are not presented in Tables 3 and 4 since both groups had very small samples and their inclusion would bias the odds ratio in a disproportionate way.

Two factors, individuality and tutorial type, significantly predicted the probability of the dialogic behaviour for dealing with conceptual difficulty while reading texts. The -2 log likelihood of the model was 224.25; $\chi^2(12) = 88.14$; $p < .001$; Nagelkerke's pseudo R^2 was 0.18. Three factors significantly predicted students' dialogic behaviour patterns while working on an assignment. These were individuality and tutorial type, as in the previous regression, as well as prior acquaintance. The -2 log likelihood of final model was 249.17; $\chi^2(12) = 79.06$; $p < .001$; Nagelkerke's pseudo R^2 was 0.16.

In general, the probability that students used intrapersonal dialogue only (relative to the intra- then interpersonal pattern) increased if students preferred to work alone (individuality). For overcoming conceptual difficulty while reading texts, the

Table 3.   Multinomial logistic regression coefficients for predicting dialogic behaviour for overcoming conceptual difficulty while reading texts

Dialogic behaviour	Predictor	B	Standard error	Wald	Sig.	Odds ratio
Intra only	Intercept	−0.87	1.03	0.70	0.402	
	[Individuality = alone]	1.27	0.49	6.85	0.009	3.57
	[Tutorials = regular]	−1.17	0.95	1.53	0.216	0.31
	[Tutorials = intensive]	−1.68	0.93	3.29	0.070	0.19
Multi-directional	Intercept	1.58	1.03	2.33	0.127	
	[Individuality = alone]	−1.58	0.27	35.38	0.000	0.21
	[Tutorials = regular]	−2.15	1.06	4.12	0.042	0.12
	[Tutorials = intensive]	−1.72	1.02	2.86	0.091	0.18

Table 4.   Multinomial logistic regression coefficients for predicting students' dialogic behaviour while working on a difficult assignment

Dialogic behaviour	Predictor	B	Std. Error	Wald	Sig.	Odds ratio
Intrapersonal only	Intercept	−1.28	0.98	1.70	0.193	
	[Individuality = alone]	1.28	0.54	5.58	0.018	3.58
	[Tutorials = regular]	−0.87	0.86	1.01	0.314	0.42
	[Tutorials = intensive]	−1.09	0.84	1.69	0.194	0.34
	[Acquaintance = yes]	−0.70	0.32	4.71	0.030	0.50
Multi-directional	Intercept	−0.06	1.18	0.00	0.958	
	[Individuality = alone]	−1.04	0.26	15.59	0.001	0.35
	[Tutorials = regular]	−1.62	1.23	1.72	0.190	0.20
	[Tutorials = intensive]	−0.33	1.17	0.08	0.776	0.72
	[Acquaintance = yes]	0.56	0.25	5.09	0.024	1.75

probability decreased if they attended intensive tutorials, and, while working on assignment, this probability decreased if they had a prior acquaintance with other students. Odds ratio within a tier indicates which variables have the most effect for that tier's category on the dependent variable. Following this rule the largest effect was individuality.

In general, the probability that students exhibited multidirectional behaviour (relative to the common intra- then interpersonal pattern) decreased if students preferred to work alone (individuality). This probability also decreased when they tried to overcome conceptual difficulty while reading if they attended regular tutorials. While working on assignment this probability increased if they had a prior acquaintance with other students. The largest effect for overcoming conceptual difficulty while reading was individuality; for solving a difficult assignment, prior acquaintance.

Since a large number of students exhibited multidirectional dialogic behaviour patterns, this group was further analysed. Six patterns were identified and these are presented in Table 5.

Types 1 and 3 as well as types 2 and 4 were merged because of their similarities. For overcoming conceptual difficulty while reading, classification Types 1 and 3 accounted for 53.5% of the respondents. Types 2 and 4 accounted for 19.8% and

Table 5.   Dialogic behaviour within multidirectional patterns

Type	1st dialogue	2nd dialogue	3rd dialogue	4th dialogue
1	Intrapersonal	Interpersonal	Intrapersonal	—
2	Interpersonal	Intrapersonal	Interpersonal	—
3	Intrapersonal	Interpersonal	Interpersonal	Intrapersonal
4	Interpersonal	Intrapersonal	Intrapersonal	Interpersonal
5	Intrapersonal	Interpersonal	Intrapersonal	Interpersonal
6	Interpersonal	Intrapersonal	Interpersonal	Intrapersonal

Type 5 accounted for 26.7%. Similar results were found for working on a difficult assignment. Next, the specific resources utilized by students in Types 1 and 3 were analysed. The initial resource for intrapersonal dialogue for more than 50% of these students was the course textbook. In the subsequent interpersonal dialogue, peers were the resource utilized by more than 50% of the students. In the final intrapersonal dialogue, more than 85% of the students searched the course website.

Partners in interpersonal dialogue

Students who engaged in interpersonal dialogue could choose from among four potential human resources: peers, staff, a combination of peers and staff (posting a question on the course website forum, or asking a question at tutorials), and seeking help from someone outside the instructional system (non-university friends, parents, employers, etc.) The third option is seen as a combination of peers and staff since it is not clear to whom a question is addressed and not clear as to who actually answers. Table 6 presents the distribution of human resources turned to for overcoming conceptual difficulty while reading and while working on a difficult assignment.

   Almost half the students turned to peers as their first partner choice for interpersonal dialogue (47.2% and 53.6% in reading and assignment respectively). An additional large number of students turned first to the peer/staff option (41.7% and 35.8% for 'reading' and 'assignment' respectively). This category included students who posted questions on the course website and those who asked questions at the next tutorial session. It is noteworthy that, within this group, the majority of students turned to the course website (73.9% in reading and 61.5% in assignment). Cramer's V correlation between the first partner choice for interpersonal dialogue in 'reading' and the first choice in 'assignment' was .75 ($p < .001$). Table 7 presents correlations between each of the structural and human resources and the first partner choice for interpersonal dialogues in 'reading' and in 'assignment'.

   The strongest significant correlation found was between a student preference to work alone (individuality) and first choice of a partner for interpersonal dialogue. An

Table 6.   Distributions (as percentages of total) of first partners turned to for overcoming conceptual difficulty while reading and while working on a difficult assignment

		First human resource for assignment			
		Peers ($n = 207$)	Staff ($n = 37$)	Peers/Staff ($n = 138$)	Others ($n = 4$)
First human resource for reading	Peers ($n = 182$)	44.3	0.8	2.1	0.0
	Staff ($n = 38$)	2.1	5.7	2.1	0.0
	Peers/Staff ($n = 161$)	7.3	2.8	31.6	0.0
	Others ($n = 5$)	0.0	0.3	0.0	1.0

Note: Some students utilized intrapersonal dialogue only, and some others left some question unanswered.

Table 7.   Cramer's V correlation between resources and first partner for interpersonal dialogue. Number of respondents ranges between 369 and 421 (some students left some questions unanswered)

Resource		First target in reading	First target in assignment
Course (structural resources)	Faculty	.07	.11
	Number of registered students	.35	.35
	Tutorials type	.20**	.14*
	Average reported participants in tutorials	.31	.30
	Number of required assignments	.25	.18
	Perceived site activity	.11	.13
Staff (human resources for interpersonal dialogues)	Instructor's availability	.02	.08
	Coordinator's accessibility	.12	.08
	Instructor's approach to teaching	.09	.10
Student (human resource for intra- and interpersonal dialogues)	Prior acquaintance	.14*	.17**
	Motivation	.15**	.10
	Perceived difficulty	.13*	.17***
	Average grade before this course	.10	.08
	Individuality	.32***	.25***

*$p < .05$; **$p < .01$; ***$p < .001$.

examination of frequency distributions for each of the two groups (those who cited a preference to work alone and those who did not) revealed that 'individualists' generally posted questions on the website or asked questions at the face-to-face tutorials. Non-individualists generally turned to peers.

A second significant correlation found was between students' choice of tutorial type and their first choice of a partner for interpersonal dialogue while overcoming conceptual difficulty when reading. That is, students who attended regular tutorials tended to post questions on the website or ask questions at the tutorial sessions whereas students who attended intensive tutorials generally turned to peers.

Other significant correlations were found between perceived course difficulty and prior acquaintance, on the one hand, and students' first choice of a partner for interpersonal dialogue while working on a difficult assignment, on the other. Students with prior acquaintances among their peers, while working on difficult assignments, generally turned to peers while students without prior acquaintances generally turned to the website or asked questions at the tutorial sessions. Students who perceived the course as difficult generally turned to peers; students who perceived the courses as easy or moderately difficult tended to post questions on the website.

Next, those factors that correlated with students' choice of partners for interpersonal dialogue for overcoming conceptual difficulty while reading (tutorial type, prior acquaintance with other students, perceived course difficulty, motivation and

Table 8. Coefficients of the multinomial logistic regression, the selection of first partner for interpersonal dialogue in 'reading' is predicted

		B	Standard error	Wald	Sig.	Odds ratio
Staff	Intercept	−2.40	0.36	43.62	0.000	
	[Tutorials = regular]	1.54	0.42	13.73	0.001	4.67
	[Individuality = alone]	0.95	0.40	5.63	0.018	2.58
Peers/staff	Intercept	−1.43	0.25	32.65	0.000	
	[Tutorials = regular]	0.95	0.33	8.29	0.004	2.57
	[Individuality = alone]	1.66	0.28	36.36	0.000	5.27

individuality) were entered into a multinomial logistic regression. The reference category was peers, the most selected resource. Two factors, individuality and tutorials, significantly predicted the probability of first partner choice for dealing with conceptual difficulty while reading texts. The -2 log likelihood of the final model was 252.81; $\chi^2(6) = 59.49$; $p < .001$; Nagelkerke's pseudo R^2 was 0.16. Parameter estimates are presented in the Table 8. This statistical procedure was repeated for those factors that correlated with students' choice of partners for interpersonal dialogue while experiencing difficulty when working on an assignment. Three factors, individuality, perceived difficulty and tutorials, significantly predicted the probability of choosing non-peer partners. The -2 log likelihood of the final model was 148.59; $\chi^2(12)= 61.67$; $p < .001$; Nagelkerke's pseudo R^2 was 0.16. Parameter estimates are presented in Table 9.

In general, the probability that students turn to staff (relative to peers) increased if they attended regular tutorials. While trying to overcome conceptual difficulty in reading, this probability also increased if students preferred to work alone (individuality) but the largest effect was for the tutorials. The probability that students turn to staff (relative to peers) in order to overcome conceptual difficulty while working on

Table 9. Coefficients of the multinomial logistic regression, the selection of first partner for interpersonal dialogue in 'assignment' is predicted

		B	Standard error	Wald	Sig.	Odds ratio
Staff	Intercept	−2.61	0.40	41.48	0.000	
	[Difficulty = low]	1.88	0.54	11.96	0.001	6.55
	[Difficulty = moderate]	0.21	0.41	0.27	0.603	1.24
	[Tutorials = regular]]	0.99	0.44	5.16	0.023	2.70
	[Individuality = alone]	0.65	0.43	2.26	0.133	1.92
Peers/staff	Intercept	−1.69	0.26	40.44	0.000	
	[Difficulty = low]	0.29	0.53	0.29	0.588	1.34
	[Difficulty = moderate]	0.74	0.24	9.65	0.002	2.09
	[Tutorials = regular]]	0.89	0.30	8.70	0.003	2.43
	[Individuality = alone]	1.11	0.28	16.13	0.001	3.04

assignments decreased as students perceived the course as difficult, and this was also the largest effect.

Generally, the probability that students turn to website or tutorials (relative to peers) increased if students scored high on individuality and if they attended regular tutorials. For overcoming conceptual difficulties while reading, the largest effect was for individuality. For assignments, the probability that students turn to the website resource or ask questions at the tutorials (relative to peers) increased also if students perceived the course as difficult, but individuality had the largest effect.

Discussion

We documented how students overcame conceptual difficulties that arose while reading texts and while working on assignments in terms of dialogue types (intrapersonal or interpersonal), and the order of their occurrence. In addition, relationships were sought between students' dialogic behaviour and selected instructional resources, both structural and human. Finally, students' use of interpersonal dialogue was explored, especially the issue of choosing a first partner. All findings made in this larger scale study support and confirm those from the previous small-scale naturalistic studies. In the discussion that ensues, we will raise several tentative explanations for the observed behaviours and point out their implications for both distance and campus-based instructional systems.

In both cases, overcoming conceptual difficulties that arose while reading texts and while working on assignments, students exhibited consistent dialogic behaviour; that is, they utilized intrapersonal dialogue first, mainly by rereading the text, and, if this action failed, they turned to interpersonal dialogue, mainly with peers. These findings replicated those cited in all three earlier studies that investigated both campus-based and distance students (Gorsky *et al.*, 2004a, b, 2006). There is a large body of psychological research dealing with cross-situational behavioural consistency, namely, if people behave in the same manner across different situations (see Funder & Colvin, 1991). It is assumed that behavioural consistency reflects an essential attribute of personality. Thus, dialogic behaviour may be seen, at least in part, as a reflection of a student's personality.

The Unified Theory of Instruction distinguishes between structural and human resources. Only one structural resource correlated with students' dialogic behaviour, namely, the number of face-to-face tutorial sessions. The probability that students engaged in out-of-class interpersonal dialogue decreased if they attended extended face-to-face tutorials. At present, within the constraints of the study, only speculations can be raised. Extended tutorials, often about 15 sessions per semester, very often resemble conventional campus-based instruction. Here, students have an alternative or a supplement to the self-instruction texts. Such sessions, also seen as resources for intrapersonal dialogue, may increase students' understanding of the material and reduce the need for interpersonal dialogue.

Each learner, at any given time, is characterized by a constellation of variables which include, among others, his or her goals for the course, prior knowledge,

motivation, intelligence and anxiety. These variables determine the extent of dialogue that occurs and, to a large degree, its quality and effectiveness. It was found that two salient student attributes correlated with their dialogic behaviour—an inclination to learn individually and prior acquaintance with peers. About learning individually, Moore (1993) found 'learner autonomy' to be a critical determinant of learner behaviour. He defined autonomy as the extent to which, in the teaching/learning relationship, it is the student rather than the instructor who determines the goals, the learning experiences and the evaluation decisions of the learning programme. In the present study, we measured only one part of this broad definition, namely, the extent to which students prefer to learn alone rather than with others. Although more than 75% of the students in the current sample reported such a preference, only about 17% reported learning alone exclusively; that is, they *never* engaged in interpersonal dialogue for any reason. One possible explanation for this discrepancy may result from a tendency that students may have to glorify a tough, lone-wolf autonomous learning style. That is, students may report this preference even though they do turn to others for help.

The correlation between 'prior acquaintance with peers' and dialogic behaviour seems straightforward and meaningful: students who know other students speak with them. If so, and if such relationships help students learn, then organizational steps may be taken by both campus-based and distance education universities to help students become acquainted with each other prior to or at the start of a course or programme. Instructors might actively encourage students to participate in study groups, be they face-to-face or virtual. Furthermore, virtual forums, both synchronous and asynchronous, should be set up and their use encouraged.

Why for many students, were peers the first partner for interpersonal dialogue despite faculty being generally available beyond the formal hours? In the previous studies cited, students reported that peers give them the answers they so much need and want, while instructors generally offer explanations that point toward some answer without giving it. Beyond this surface-level explanation, which has high face validity, several psychological ones appear in the literature. These suggest that individuals under threat (in these cases, students) avoid social comparison with others who are in better shape than they are, namely, teachers (Wills, 1981; Wood *et al.*, 1985; Harlow & Cantor, 1995). Furthermore, Wills (1987) suggests that when people are emotionally shaken, they need both informational and emotional supports. In this case, their support seeking may be temporally patterned, in that they may first seek emotional support to alleviate distress, and then go on to seek support that will help them to surmount the challenges presented by the task (Cantor & Harlow, 1994). Peers may offer both emotional ('Wow, the assignments are really hard!') as well as informational support. These explanations will be tested in future research.

Whatever the reasons that students turn primarily to peers, this finding illustrates clearly the tension between learning theories that emphasize the importance of social learning (e.g. Bruner, 1966; Rogers, 1969; Vygotsky, 1978; Garrison & Anderson, 2003), on the one hand, and practices engaged in by distance education students, on the other. Theories that emphasize the importance of social learning often assign to interpersonal instructor–student dialogue an importance that may not be realized in

distance education practice. In other words, it appears that students utilize interpersonal dialogue primarily for overcoming conceptual difficulty (while reading and while doing assignments), and not for initial information processing.

Interestingly, instructors' approaches to teaching (as perceived by the students) did not correlate with students' dialogic behaviour. This finding calls into question the assumption that instructors' approaches to teaching do indeed influence students' dialogic behaviour. Here, it was found that the role of instructor, in the face-to-face tutorials, was seen more as a lecturer and much less as a learning facilitator. Choosing a teacher-centred approach is a pedagogic decision, not an institutional policy. Thus, although the Open University of Israel relies on self-learning, it seems less plausible that this effect is an artefact of the OUI approach, because both teacher-centred and student-centred approaches could assist students in overcoming difficulties with understanding. Further research is needed to determine the relationship between students' dialogic behaviour and different approaches to teaching, especially in campus-based systems.

The present study revealed an unexpected pattern of dialogic behaviour that was termed 'multidirectional'. Many students fluctuated between intrapersonal and interpersonal dialogues. Further analysis of this phenomenon revealed a common pattern: most multidirectional behaviours were of the 'intrapersonal to interpersonal back to intrapersonal' type. Specifically, students first reread texts, then turned to peers and finally searched the course website for answers. Although the current study cannot explain why this behaviour occurred, at least two tentative explanations may be raised. First, students returned to intrapersonal dialogue, generally by using website materials, since they were not satisfied with the help received through interpersonal dialogue. Although websites offer (via intrapersonal dialogue) various sources such as previous examinations and assignments, simulations and instructional materials, they do not offer specific solutions to the problems at hand. Therefore, although the utilization of this resource for interpersonal dialogue is impressively large, its utilization for intrapersonal dialogue is limited and utilized apparently after the other resources failed. Second, as suggested earlier, after turning to peers for assistance, students may return to intrapersonal dialogue in order to assess the new input; that is, they can test what they learned using the various sources presented over the website.

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