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ABSTRACT
                To evaluate the efficacy of faculty seminars for
writing across the curriculum given for the instructors at Robert
Morris College (Pennsylvania), an examination of the instructors'
verbal protocols was conducted. Eleven faculty members from a variety
of disciplines who participated in the 45 hour-long seminars and
eight who did not participate were tape recorded as they "planned out
loud" a writing assignment for their respective courses. Participants
were asked to describe their main concerns for teaching and learning
as they devised the assignment. Analysis of the transcripts showed
that teachers who participated in the writing across the curriculum
seminars had a larger, more clearly defined repertoire of strategies
for planning a variety of writing assignments appropriate for their
courses. Additionally, unlike the nonparticipants, the participants
used the writing assignments they planned to aid student learning,
rather than just to test student knowledge. They also planned the
assignment to help students solve particular problems, and integrated
the assignment into what was being studied, so that students would
see the relationship between writing and learning. The protocol
analysis suggests that the writing seminars are an effective way to
instruct teachers in the basics of content area writing instruction,
and that they improve teacher attitudes and behavior concerning
writing assignments. (Transcriptions of two teacher protocols are
included, one from a seminar participant and the other from a
nonparticipant.) (JC)

TEACHER PROTOCOLS: A NEW EVALUATION TOOL FOR WRITING ACROSS THE CURRICULUM PROGRAMS

by

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TEACHER PROTOCOLS: A NEW EVALUATION TOOL FOR

WRITING ACROSS THE CURRICULUM PROGRAMS

In their latest book *Writing Across the Disciplines: Research Into Practice* (1986) Art Young and Toby Fulwiler make the point that when their program was already four years old, they had to reconsider what it was that they were actually able to evaluate. After they had practiced over a decade of writing across the curriculum at Michigan Technological University, Young and Fulwiler commented, "It now seems surprising how slowly it dawned on us that if we wanted to measure any effect produced directly by the program we should measure the effect closest to the actual treatment itself and not some effect several removes later. In other words, we should measure the impact on the faculty first and only later try to measure the impact on students" (Young & Fulwiler, p. 50).

During those first four years Young and Fulwiler were conducting a series of faculty seminars to help faculty integrate write-to-learn assignments in all disciplines across the curriculum. They were also at that time collecting as much data as they could about student and faculty performances and attitudes. Yet, they found that what was actually

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measureable in the first few years was change in faculty attitudes toward writing; only later could they begin to measure improvement in student learning and writing.

If the faculty must first plan to integrate multiple, various writing tasks in their courses before students can begin to use writing as a learning tool, it seems reasonable that faculty ought to be the first population to call upon for the institution's evaluation effort. Following the example of Young and Fulwiler, we at Robert Morris College (for our now three-year old program) have designed a multiple-measure evaluation collecting as much information as we can about faculty, student, and administration's respective attitudes toward writing. We have also sought to collect information about students' improved performance in the target courses of our writing across the curriculum program but have not yet been able to equate improved learning of a particular discipline with improved writing ability. Finally and most immediately, we have been systematically collecting data about faculty in their processes of planning and integrating writing into their particular course designs.

It is this last area of data collection--faculty's planning and integration of writing tasks--that has led us to use protocol research methodology as an instrument for evaluating the successes and failures of

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our program.   Protocol analysis is one of our many measures but, in my

opinion, the most original and significant of all thus far. In fact, I know of

no other writing across the curriculum program that has used teacher

protocols as an evaluation measure in assessing an institution-wide

program.

As an evaluation tool, verbal protocols enable us to collect

quantitative, raw data "in as hard a form as could be wished" (Ericsso , &

Simon, 1984, p.4). Talk-aloud protocols, made known outside studies of

writing by Ericsson and Simon (1984), have been used to discover models

of problem-solving processes. Flower and Hayes (1979) have used the

same research method to discover cognitive models of the composing

process. However, protocol research has not yet been explored as a means

to discover the planning processes which teachers use as they design and

integrate writing tasks in particular courses across the disciplines.

In this paper, with some illustrations from the protocol transcriptions

which we have collected from teachers in a variety of disciplines in the

arts, sciences, and business at Robert Morris College, I would like to

demonstrate that teacher protocols are not only a new but very effective

evaluation tool for writing across the curriculum programs. Also, over the

long term teacher protocols can provide valuable insights into model

teacher planning processes as teachers design and integrate appropriate

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writing tasks discipline by discipline.

For example, we have asked faculty to perform the following task for a talk-aloud protocol. That is, faculty talk aloud into a tape recorder and these tapes are later transcribed for analysis.

THE TASK FOR THE TEACHER IN A TALK-ALOUD PROTOCOL

Devise one writing assignment for your course (name course).
While you are devising the assignment, describe as fully as you
can your main teaching/learning concerns. Talk aloud about
what is going on in your mind while you are doing the task.
Write the words for the assignment, which you would have typed
hand to the student.

Here are examples of the transcriptions of two teacher protocols from an upper-level course in management information systems. One of the teachers particpated in our forty-five semester hour long faculty seminars in writing across the curriculum while the other did not. Perhaps the most distinguishing feature between the two transcriptions is that the participant saw the writing assignment as an aid to learning--to achieving a specific course goal, i.e., "distinguish between information and data." The participant thereby planned the writing assignment as an integral part of the course design to help the student achieve the course objective. The non-participant, on the other hand, saw the writing assignment as the finished product of the students' thinking--as a "persuasive communication to a superior" with all the correct features of spelling and grammar.

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TRANSCRIPTION OF A PARTICIPANT'S VERBAL PROTOCOL

S: All right - ah - if I have to design a writing assignment, then I need to look at the course goals and as I had before since this is the same course I have the same goals. So for instance one of my goals that I have been thinking about right now is the one that I call 2.2A. I don't know if you still have my goals from last time but if not we can zerox these. Ah - which I said, given a list of items, be able to distinguish data from information. Name the attributes of information, state them in your own words. Those are - that's my operational objective for - for having students able to distinguished - distinguish what is a useful information versus what is data. Ah - and this is what I didn't do last time so that's why - it's brand new - I haven't done one for this particular goal.

Ah - so I'll write that down - be able - to distinguish data from information - I just picked this one off the top of my head - I don't even know if I'll end up using it. My first thought is that what I want them to be able to do is -ah- appreciate the context of a user - if that makes any sense. I want them to picture the mind set of a user and therefore that before they can start deciding what's data versus what's information they need to -ah- identify a user and so I'm - I'm kind of thinking just broadly what kinds of -ah- what kind of things I would have them do. They're going to have to identify a user or have me provide it for them. I

haven't decided that yet. Ah - they're going to have to -ah- decide what kinds of decisions - what kinds - this doesn't look very narrative, does it matter? I'll just say first students should identify user then they should list what kinds of decisions and this I had trouble with last term - what kinds of decisions the user needs to make and what background the user has and what kinds of things are needed , I guess, what kinds of - I don't like to use the word information because that's part of the assignment - what kinds of -ah- well I'll just say - I don't know what to say - I'll leave it blank. What kind of blank is needed for making decisions - making the decisions.

And then, so that, I'm basically outlining my task the way I'm envisioning it right now. Yet what I have to give to the student should be -ah- some kind of a narrative description that would identify a particular user, would identify the kinds of things they do -ah- and kind of a general statement of what their goals are, what kinds of background they have and then the student would need to determine what kinds of information - I'll say it that way - is needed for making the decision. And then I want them to be able to list or evaluate a list of items that I give them to tell me whether they're data or whether they're information - whether they're - in this particular case. And that would probably be my - and why. So I would ask

them to write a short description of each one maybe little couple of sentences that would describe whether or not something is date for this particular use or whether it's information I would envision this being done probably out of class so that we could discuss it in class. Ah - and -so in my own mind I've kind of outlined what I want to do but I haven't outline any of the specifics so that my next task would then be to identify a specific user that - that I thought they could particularly relate to.

That's been one of my problems when I've done the course in the past is the students relate less to users than I expect them to. Last term I had a real problem with - with distinguishing decisions users make. Ah - and so - one idea that just comes to mind is maybe I want to think about a college registrar. Maybe they can appreicate what a college registrar might have to do. What kinds of decisions a college registrar would make. And -ah- that makes me think that it's probably better for me to ask them to come up with the narrative description of the user rather than me providing it. In the past I've done that so I'm kind of modifying my own statement as I started out and say - now I don't know why - it's just a feeling that I want them to express in as much detail as they can what kinds of - what kinds of decisions that are being made - that's an underlying goal of the whole course - the trouble that they have. And then I can give them specific data in this case my big class a student - lots of data about a student like

-ah- past grades, transcripts of data, financial information, names, addresses, all the stuff that I could think about about a student and -ah- I would ask them to evaluate whether or not the registrar let's say - I'm not sure that's a good one but some particular individual is going to - would find that as - that is what is information for that individual - what is required.

Now, to actually design it it's probably going to take me a couple hours since I haven't done this one. I think the one I did for you before I had reasonably designed because I had examples there. This one is something I'm going to have to write -ah- so but that would be my general approach, but more the -

TRANSCRIPTION OF A NON-PARTICIPANT'S VERBAL PROTOCOL

S: All right. ~~my main concern in assignments of this type~~ ~~is to give the student the ability to concentrate on a~~ ~~now and while he is concentrating on that to~~ ~~up with a written thought about what the~~ ~~particular general problem is—ah—in the case study and~~ ~~particularly an overview~~ - what he can do about it. In other words how he can correct the perceived problem in each case study. Ah - the main part of each case study - the body of each case study generally runs anywhere from six to eight pages and the concluding part of it gives a number of questions that should be answered by each student. And then beyond that each student can add to it anything that he or she wants. But basically I want the student to write down the answer to each specific question after reading the particular case study twice. And the reason - the reason I like them to read it twice - I like them to read the study the first time and basically get a general idea of what the study is about and maybe get some thought patterns generating up in their mind. The second time I want them to read it in a more detailed fashion so that they can find the specifics of what may be wrong with the particular case.

E: Could you sort of just keep talking, sort of talk out loud about what you're writing.

S: So anyway after the second reading I feel that they're then able to start interacting. On some of these cases I permit them to interact with each other in discussing the case; however at the time that the students have - have generated enough oral exposure, then each student is required to write an opinion as to what the specific answers to the questions at the end of the case study may be. Then they are required to write an overall opinion not taken from the questions but whether - rather from a global view of what the main overall concern is and also what should be done to correct the situation. In addition, each student is required to come up with a written list of alternate solutions to the problem. The alternate list is to be perceived as the written document or communication report to a superior although the superior will often choose the desired alternates from a list of solutions. I ask each student to select the alternate that they would prefer if they were the superior. I also ask each student to present the case in writing in such a way as to convince the superior through the communication process that the detailed solutions are complete, comprehensive, and practical.

The students will then be graded in competition with each other since no solution is necessarily better than another. Therefore I look for persuasive communication -

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E: Try and talk about what you're thinking.

S: Really - right now I'm just thinking to see if I may have
missed anything. Ah - even though this is written more
concisely than the way I am writing it now - obviously I may
take hours to write this - in my mind I'm thinking about how
I'm going to present it verbally because students are never
really completely satisfied with written instructions. They
like more detailed verbal explanations and right now I'm
thinking in my mind if I missed anything or how I'm going to
explain these words to them verbally.

As far as my main teaching/learning concern -ah- obviously
my main concern is the way in which the student uses his
written communications skills to solve a problem and to
present it in a persuasive manner. I do consider in grading
this report that the spelling, grammar, and other means of
expressing oneself beyond just a correct solution perceived
is of importance.

These teacher verbal protocols provide both quantitative and qualitative data. (For a distinction between qualitative and quantitative data, see Witte and Faigley's *Evaluating College Writing Programs* 1983). First, from a quantitative perspective and in the context of our experimental evaluation design, we have accumulated and analyzed data from eleven faculty (in the experimental group who underwent faculty seminars on writing across the curriculum) and from eight faculty in the control group (who did not participate in the writing across the curriculum faculty seminars but were teaching other sections of the same courses). The data show that teachers who particcpated in the writing across the curriculum seminars have a larger, more clearly defined repertoire of strategies for planning a variety of writing assignments appropriate for their courses. These data contrast sharply with those of the control group who had relatively few, if any, strategies to call upon for using writing as a learning tool.

Out protocol analyst Nancy Penrose from Carnegie Mellon University was able to identify fourteen unanticipated features, which she measured in both the experimental and control groups of teachers, i e , in both the faculty participants and non-participants (1986). Here are some contrasting results between the two groups for five of these features

CHART 1

Features of Teachers' Planning of Writing Tasks	Participant	Non-Participant
The teacher realizes that creating an assignment is a rhetorical task.	30%	13%
The teacher is concerned that students see the purpose of the writing.	30%	0%
The teacher has thought about the task in concrete, operational terms--has considered the sub-tasks involved.	100%	88%
The teacher is sensitive to students' abilities and acts on that information by modifying the writing task, providing extra guidance, etc.	90%	25%
The teacher hopes that the writing assignment will help improve the students' writing skills.	0%	75%

Remember that 75% of the non-participants were trying to improve student writing while none of the participants was trying to teach writing or improve writing skills. Rather the participants were trying to use writing in many ways to aid students in the learning process. The protocol transcriptions of the non-participants are particularly relevant here.

> I hope it the writing would help students feel less intimidated about science and math . . . I think if it doesn't do that, it helps them to sit down and to write. I think it might help improve their writing skills a little. . .

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> ...the chief executive officer ...of Westinghouse
> pointed out that two of the key problems in hiring
> entry-level people today was their lack of writing
> skills and their lack of analytical skills. This writing
> task addresses both...

From a qualitative perspective, we have also been concerned about the
nature of the writing assignments which our faculty conceive as
appropriate to assist students in their achievement of course objectives.
We want to gain insights about whether our faculty are able to design
writing assignments that genuinely function as aids to learning and not as
just another test of students' knowledge. Again, some contrasting data:
Those faculty who had _participated_ clearly conceived of the nature, uses,
and functions of writing differently from those who had not participated.
In those qualitative areas, these were the results in three of the eight
discriminations which Richard Young of Carnegie Mellon and I were
investigating:

CHART 2

Features of Teachers' Planning of Writing Task	Participant	Non-Participant
The teacher designs and uses the writing assignment to do more than test students' knowledge--to prmote student learning.	100%	50%
The teacher plans the writing assignment to lead the student toward solving a particular problem in achieving course objective(s).	80%	30%

The teacher plans to integrate the
writing assignment into the on-
going learning process of the course.   90%   50%

The participants' protocol transcriptions are relevant here since 90% of

them planned writing assignments so that they would be integrated into

the on-going learning processes of the course:

> This is to tie the . . . writing directly with the material
> that we're going over in class, whir. would be relating
> management objectives and philosophy with actual prob-
> lems or situations that may be occurring within their work
> situation.
>
> So the concept of the journal with their written
> comments and evaluations will be important at the
> beginning for them to see the connection between
> the writing that they do in their journal and the
> speaking activities that we're going to have.

Thus far these verbal protocols have provided us with the means to

evaluate teachers' planning and designing of writing tasks discipline by

discipline. These protocols have given us some distinctions between

participants and non-participants in terms of thirty-one measureable

features of their writing assignments. And, as you can see from this

sampling of data, the protocols have also enabled us to view the quality of

what 's going on as teachers plan their courses--integrating their designs

of writing tasks within their courses.

Beyond their function as a powerful evaluation tool, teacher protocols

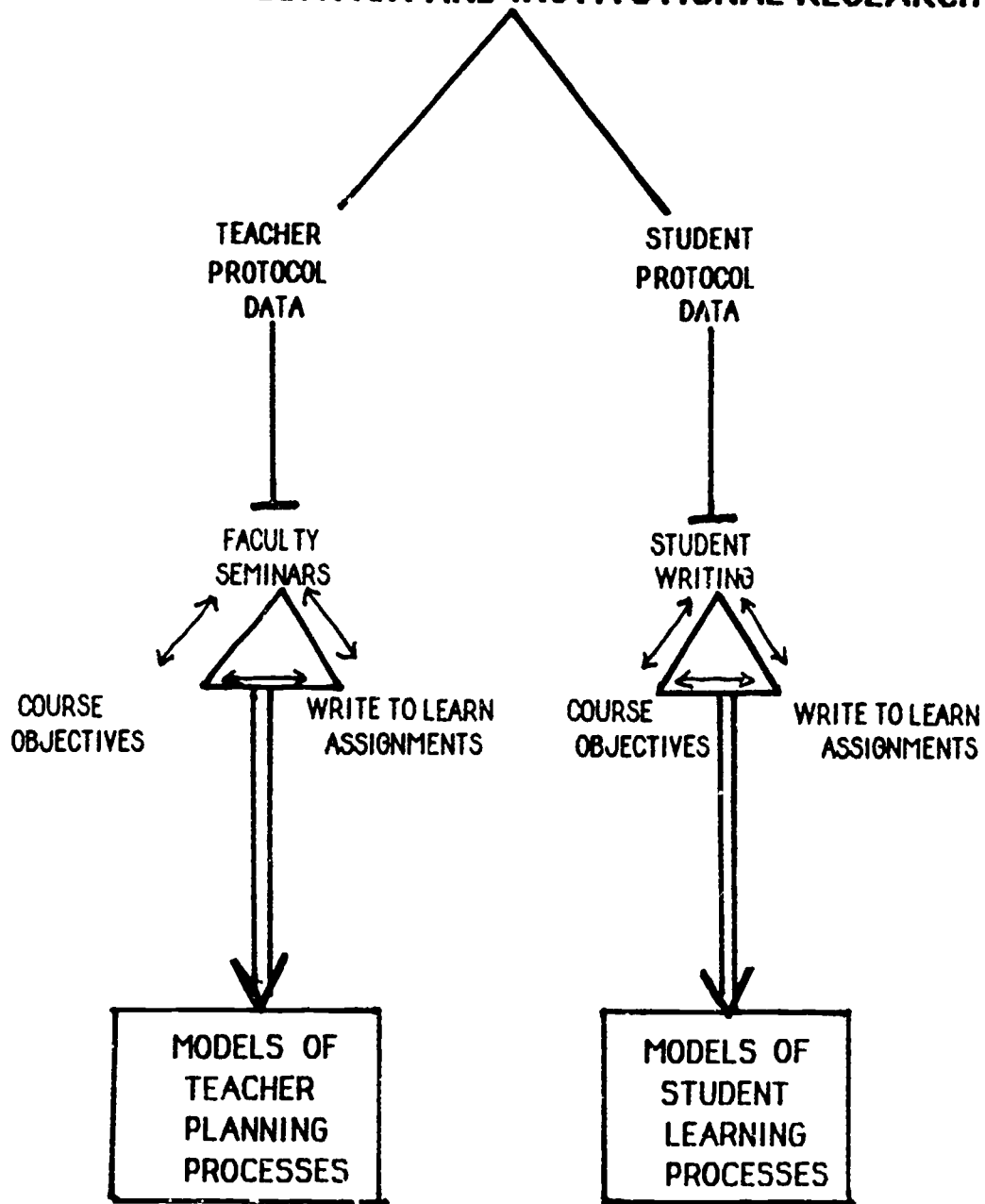serve yet another function: They have provided the base for many of our

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faculty to pursue their own research interests while at the same time

opened the door to academic institutional research for Robert Morris

College. Let me explain:

These protocol data, which protocol researchers would argue provide

incomparable hard evidence in evaluation, have helped us begin to imagine

models of expert teacher planning processes for integrating meaningful

writing tasks into the disicplines across our curriculum. The data which

we continue to accumulate is allowing us to pursue two different sets of

research questions: 1) What are the planning processes teachers use to

construct write-to-learn tasks? Can we derive models of teachers'

planning processes? 2) What are the writing processes students use to

perform these write-to-learn tasks? Can we derive models of students'

learning processes?

Figure 1 illustrates the two sets of research questions tied to using

protocol research methodology. In order to get at faculty learning

processes, our protocol analysis allows us to examine whether faculty in

the writing across the curriulum program designed writing assignments

drawn from principles learned in the faculty seminars --to help students

better achieve course goals. We are also planning to analyze student

protocols in order to examine whether students participating in targeted

FIGURE I

TALK-ALOUD PROTOCOLS FOR
PROGRAM EVALUATION AND INSTITUTIONAL RESEARCH

TEACHER PROTOCOL DATA	STUDENT PROTOCOL DATA

FACULTY SEMINARS

STUDENT WRITING

COURSE OBJECTIVES   WRITE TO LEARN ASSIGNMENTS

COURSE OBJECTIVES   WRITE TO LEARN ASSIGNMENTS

MODELS OF
TEACHER
PLANNING
PROCESSES

MODELS OF
STUDENT
LEARNING
PROCESSES

What are teacher planning processes?
Can we derive models discipline by
   discipline?

What are student learning processes?
Can we derive models discipline by
   discipline?

writing across the curriculum courses have developed more expert

learning processes in performing the writing assignments to better

achieve course goals.

Perhaps in the not too distant future, we can use this data to generate

expert systems in computer software to help faculty design and integrate

writing tasks discipline by discipline. But for the moment, let's return to

the reality of the data we hold.

There are some conclusions that we have been able to draw about our

program based on these data. First, in a formative way, the data we have

been accumulating through protocols continues to help us monitor the

seminars, classroom practices and other writing across the curriculum

activities. Through these we have not only been able to discover what's

right and what's wrong with our program, but we have also been able to

make necessary adjustments along the way.

Second, there are a number of summative (evaluation) statements

which the teacher protocols permit us to make:

   1. We can judge the success of our 45-hour intensive

      faculty seminars. For example, our protocol analyst Nancy

      Penrose offered these summative statements about our

      first set of data:

      The protocol/interview technique provides valuable

information for assessing the success of the faculty seminars. Overall, seminar particpants differed from non-participants on measures of attitude and teaching behavior. Participants typically view writing as a means for learning rather than as a testing device or an opportunity for practicing writing skills. Their use of writing in the classroom reflects these attitudes. Participants are more likely than non-participants to develop assignments that further the learning objectives of their courses and that are integrated into the course structure.... The results of the present analyses indicate that the faculty seminars provide an effective means for communicating the fundamental principles of the writing across the curriculum program and for changing the way writing is used in courses at Robert Morris" (Penrose, 1986).

2. The protocol analysis corrobrates the findings from our analyses of teacher attitude surveys. That is, our participants have changed their conception of writing assignments and their place in their course designs, and our faculty have acted on that information.

3. The protocol analysis reveals that participating faculty know how to plan for and design writing tasks that aid learning and that further they know how to plan courses that accommodate write-to-learn tasks.

4. The protocol analysis reveals that faculty participants view writing much differently from non-participants.

5. The faculty's experience with protocols has shown them the

significance of their contributions in the institution's

evaluation effort and has also provided them with a database

to pursue collective and individual research efforts.

Thus, the research methodology helps us get an idea of what the

participants take away from the seminars and of how this training affects

their work and attitudes. It is important to note that such information is

not readily available through other means such as surveys or classroom

visits.

In their 1986 text *Writing Across the Disciplines*, Young and

Fulwiler explained why they kept pursuing their multiple-measure

approach to evaluation. They say in their book, "Collect all the data

possible because it simply gives us more inofrmation on which to base our

overall assessment" (p.52). I heartily concur with their aporoach. And in

addition I would recommend using teacher protocols in the context of

multiple-measure evaluation. Teacher protocols specifically lend isight

into ways which teachers can more effectively integrate writing tasks

within their course designs. And they can guide teachers in planning

writing assignments into their courses so that students will more

efficiently achieve their course objectives.

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