ABSTRACT: Personnel in the McKay Institute and the English Language Center (ELC) at Brigham Young University have developed interactive videodisc workstations for use with non-native English-speaking students enrolled in the ELC program. These workstations, using the movie "Raiders of the Lost Ark" as an authentic language experience with student-controlled instructional processes, are evaluated according to their effectiveness and motivational value in teaching English as a second language. Nineteen ELC students (nine female and ten male) were involved in this three-week study. Two variations of the workstations were compared, each applying the instructional processes in different ways. Questionnaires and interviews were used to elicit subjects’ affective responses and patterns of learning employed in the workstations. The results of the questionnaires and interviews indicated that both workstations were motivating and stimulating. These results should be viewed with the understanding that the subjects were volunteers. Pretest/posttest gain scores were used for two purposes: first, in an attempt to find significant differences in the instructional processes involved in this method of instruction, and second, to find whether one workstation was more effective than the other. The test was designed to measure the effectiveness of the workstations in teaching content, vocabulary, and idiomatic expressions. Significant difference in effectiveness between the workstations was found only in the area of idiomatic expressions. Differences in the application of the instructional processes, however, proved substantial for the subjects and merit attention. This is a report of an evaluation and therefore may not be generalized for all interactive videodisc workstations. It may prove
helpful, however, to those who anticipate incorporating interactive videodisc into their language lab.

KEYWORDS: Annotated movie, ESL, 'Raiders of the Lost Ark,' template, videodisc.

Introduction

The videodisc and microcomputer technologies can be used in new and interesting ways to teach language. The high cost of video production, however, has limited the development of new video materials needed to take advantage of the capabilities of these new technologies. This article reports evaluation findings of a computer instructional program developed to overcome this problem. The questions we address in this report concern whether existing video materials can be used as stimulating instruction, and whether this process can add to the learning achievement of the student. If existing video materials can be recycled into interactive programs that increase the level of learning, we have available a large store of language materials that can be used at very low cost.

Several years ago, the McKay Institute at Brigham Young University developed a computer program to annotate an existing Spanish film transferred to videodisc. This computer program was designed so that any other videodisc could also be annotated by merely filling in new files in the basic program. Hence, this program was designated as a template. The template program can be used to create new annotations without requiring a programmer. The files are created on a word processor, then scanned and transferred into the run program by the annotate program. Updates, corrections, or changes are easy to make on a word processor. The tasks involved in creating an operational program include (1) creating a description file to define scene lengths by beginning and ending frame numbers, (2) creating a question file for each scene, and (3) creating an answer file for each scene. A scene can be a motion segment or a still frame. Two sets of the question and answer files are accommodated in an annotate program. These can be used for parallel questions and answers in two different languages, or for two levels of difficulty, or any other pair of data items, such as linguistic versus cultural consideration; two levels of language vocabulary, etc.

The number of students studying ESL at Brigham Young University makes the use of English language videodiscs an attractive opportunity to enhance and enlarge the ESL program. There are 80 to 100 pre-college students per semester in the intensive ESL program. The intensive ESL program is
designed to help adults and youth engage in normal social communication and make use of mass media produced in English--movies, TV, radio, newspapers, and periodicals. The broadcast medium, which provides opportunities for listening and comprehension, is nevertheless transitory and cannot be repeated at will or studied repeatedly unless recorded. Even when the material is recorded, it is not possible to control it easily with standard audio or video recorders. But when videodiscs under computer control are used, the student can have easy control for review and pacing. When more material is added in the form of footnotes, the interactive videodisc becomes a rich resource for the study of English. Commercial production of videodiscs for mass market has reduced the cost of full-length movies to less than fifty dollars, making this medium inexpensive while also permitting it to be controlled with great speed and precision by microcomputers. The combining of videodisc and microcomputer technologies has initiated the age of interactive video which we are just entering, and which promises to bring an abundance of language materials into existence at very low cost. The initial results are reported below.

In the fall of 1984, personnel in the English Language Center at Brigham Young University and the McKay Institute began working together on an interactive videodisc project that would use a commercially available videodisc and the Annotate authoring system. The videodisc chosen was Raiders of the Lost Ark, in part because it contains both the type of action that would likely interest ELC students, and abundant dialogue which can be used for instruction in vocabulary, idiomatic expressions, and language comprehension in general. Also, it was available in the constant angular velocity (CAV), or "standard play" mode, which is necessary for computer control. Unfortunately, most commercial videodisc movies are not CAV mode and therefore are not able to be controlled by computer. There are, however, many other videodisc programs available in CAV mode.

Because many videodiscs have a label that states "For Home Use Only," it has been assumed by most educators that these videodiscs could not be used for educational purposes. This may not be the case. A summary of the copyright law by Ken Winslow reveals that a growing number of educational institutions are looking at videodiscs, such as the Space Archive series, as a low-cost resource for use in schools. Winslow states the following in regard to the legal question of such use:
Cross Over Programming.
A . . . source of videodisc programming . . . being sought by school users is that of a cross over nature, programs with good production and entertainment or other attention getting values which are priced for distribution through current home video retailing channels but containing subject matter considered useful for school classroom and related instructional purposes. The designation made for such programming, whose pricing AND content has appeal to both home and institutional users, is 'cross over programming.'

The Legal Question.
In spite of a considerable amount of both misinformation and disinformation by some who seek to keep the traditionally higher priced sale of life-licensed copies to schools or other institutional users separate from the outright sale of lower priced copies for home use, the copyright law provides specific exemption for schools to use legally acquired cross over programming in classroom instruction so long as they avoid using that programming in any other public performance situation.

The Legal Opinion.
The legal opinion seen by us is that any school which purchases a legitimate copy of a home video priced program as a result of an outright and unconditional sale may use this program in classroom instruction despite any and all notices contained on the packaging or appearing on the screen. (Winslow 1983:4-5)

The above summary would cover the purchase of videodiscs, such as Raiders of the Lost Ark, which could then be used in teaching ESL with programs like our Annotate. The question for the developers and distributors of the annotation on floppy discs is whether using Raiders in this mode constitutes a violation of copyright law. We think not, but such usage and distribution is new and has not been tested thus far in any court case of which we are aware. In our opinion, as long as the basic use of the Raiders videodisc conforms to the exceptions provided in the copyright law, the additional use of a computer to manage the visual material and add footnotes is little different from an instructor's use of the hand-held controller to stop the program and explain and ask questions, a situation clearly within the copyright law.
The three major goals of the interactive videodisc (IAVD) project include: increasing students’ understanding of language in context; creating a less inhibitive learning atmosphere; and providing a motivating instructional experience.

The IAVD project evaluated here used the Annotate authoring system so that users were able to access the various options at the conclusion of each scene. The system consists of a Sony SMC-70 microcomputer interfaced with a Pioneer LDV-6000 videodisc player. Automatic stops were programmed into the IAVD workstation at the end of each scene. The instruction involves having the student watch a scene from the videodisc; then presented on the monitor are questions regarding the content from that scene. For the student, the experience is simply watching a movie, scene by scene, that can be stopped at any time to check vocabulary, idiomatic expressions, or answer content questions. Upon stopping the movie, or at the end of a scene, the student has several options:

1. Viewing the answers to the questions, one at a time.
2. Reviewing that scene or a previous scene.
3. Accessing harder questions.
4. Accessing the dictionary for vocabulary words from that scene.
5. Accessing the list of idiomatic expressions from that scene.
6. Accessing the script from that scene.
7. Skipping the questions and other options and continuing with the movie.

A control group (non-IAVD) had access to the same videodisc, script, and questions as the IAVD group. They used a pioneer PR-7280 in a stand-alone mode with the manual control device rather than having full computer control.

**Evaluation Focus and Design**

This evaluation report focuses on the implementation, the processes, and the intended outcomes of this project. The degree to which the program is implemented as planned and the extent to which the program achieved its objectives are reported. Since this is an evaluation study, results from many of the variables studied may not be generalizable to other interactive videodisc programs.

Five evaluation questions are the focus of this study:

1. Will the students involved in the IAVD workstation learn more effectively than students in the noninteractive videodisc (non-IAVD) workstation in the areas of a) content comprehension? b) vocabulary? c) idiomatic expressions?
2. What were the costs in the design, development, implementation, and maintenance of the interactive videodisc workstation?
   3. Was the IAVD workstation implemented so that it functioned properly? a) Were there any major breakdowns or interruptions? b) Was the computer program sufficiently clear so that students could work on the delivery system independently?
   4. Will the students involved in the IAVD and the non-IAVD workstations perceive these methods of instruction to be as effective and motivating as other delivery systems, such as videotapes, audiotapes and computer-assisted instruction?
   5. Will students view this individualized instructional approach as less intimidating when errors are made than group language learning systems?

Methods
1. Subjects
   Participants in this study were students in the top three levels, three through five, at the English Language Center (ELC). These non-native English-speaking students take noncollege credit classes daily at the ELC. Students at the ELC were selected on the basis of their dependability. Stratified random sampling was employed based on subjects' English proficiency levels for assignment to IAVD and non-IAVD groups. Twenty of the ELC students volunteered to participate in the project. Of these twenty, nineteen completed the full study, ten in the IAVD group and nine in the non-IAVD group. One non-IAVD group subject was dropped from the study for absences.

   There was not use of a control group consisting of non-participating ELC students for two reasons. First, since the study lasted for only three weeks and taught information completely unassociated to that being taught in the ELC classroom, we felt using pretest scores in lieu of a control group was justified. Secondly, we needed all of those students who volunteered to be part of the study itself. Using non-volunteers as a control group would be less favorable than using the subjects’ pretest scores.

   The subjects were from Southeast Asia, Latin America, the Middle East, and Europe. In the IAVD group there were 4 females and 6 males; in the non-IAVD group there were 5 females and 4 males. Equivalence of the IAVD and non-IAVD groups was determined by use of a variety of measures. First, the mean English proficiency level for IAVD subject was 4.35, and for the non-IAVD subjects 4.22. Second, the mean age of IAVD subjects was 21.7, and for the non-IAVD subjects 22.7. And finally, the group mean length of time subjects had been in the United States was 4.1 months for IAVD subjects and 3.6 months for non-
IAVD subjects. No significant differences in any of the measures were found.

2. Equipment

The study took place in the BYU Videodisc Lab. Subjects in the IAVD group worked with the Sony SMC-70 microcomputer interfaced with a Pioneer LD-V6000 videodisc player. Their workstation included all the options described in the introduction. The IAVD workstation was designed to stop automatically at the end of each scene and then present the learner with the list of options. Subjects in the non-IAVD group worked with a Pioneer PR-7820 player as a stand-alone machine, with manual rather than computer control. The non-IAVD group had immediate access to a dictionary, an idiomatic expressions resource book, and a printed script.

3. Procedures

The evaluation study lasted for three weeks and involved five half-hour sessions scheduled three times a week. Two sessions had to be rescheduled due to school holidays. The first session included the showing of side one of the videodisc, followed by the pretest, which contained questions pertaining to side two of the videodisc to be used in the study.

Both workstations involved the identical portions of the movie on the videodisc (side two) and had similar options available to them. The major differences were these:

1. The IAVD workstation videodisc was presented in preprogrammed, computer-controlled segments according to scene. The non-IAVD workstation had no programmed stops, but rather was under user control with a hand-held controller.

2. The IAVD subjects had on-line access to questions and answers covering the content of each scene. Included was the option for accessing more difficult questions and their answers.

3. The accessibility of the dictionary and idiomatic expressions references also differed. The IAVD group had these divided according to scene with a single key press for access, while the non-IAVD group had a standard dictionary and idiomatic expressions reference book.

The purpose of this division of groups was to see whether the instructional processes involved in one group were more effective than those involved in the other. This was not intended to be a media comparison (both groups viewed the same video content), but rather an evaluation of the processes involved in each user-controlled authentic language experience as well as the
overall effectiveness and acceptance of these types of instruction.

The pretest was designed to assess subjects' prior knowledge of three areas: content; idioms; and vocabulary used in the movie. It was administered to all subjects. Group means were computed to check for equivalence. The IAVD subjects' pretest mean score was 22.9, and the non-IAVD subjects' was 23.3, showing no significant difference (independent samples t-test, t(17) = .085).

The posttest was identical to the pretest. It was designed to measure the gains subjects made during the study. The mean gain scores of both groups were calculated for each test area.

A questionnaire was given following the study. Three days later a follow-up questionnaire was administered, along with a group interview. The first questionnaire contained sections on demographics, open-ended questions, and forced-choice questions. Demographics information was used to help determine equivalence of groups and which type of instruction proved more effective for differing categories of subjects. The group interview was held to clarify some of the responses received on the first questionnaire and verify observations made during the course of the study.

Findings

In order to determine if this instructional method would help students improve their content comprehension, both groups were administered pretests and posttests as described earlier. The annotated videodisc instructional process is the key element of difference between these two delivery systems and other systems currently available for language instruction. These other labs include a computer-assisted instruction lab and an audiovisual lab which uses audiostream and videocassette workstations. Pretest and posttest mean scores were computed for all subjects combined. The pretest was used to compare posttest gains rather than a control group consisting of non-participating ELC students. Since the study lasted for only three weeks and taught information completely unassociated to that being taught in the ELC classroom, we felt using pretest scores in lieu of this control group to be appropriate. The pretest-posttest gain of 18.6 for the combined groups when subjected to a dependent sample one-tailed t-test showed significant difference, t(18) = 9.618, p < .001.

The effectiveness of each instructional process involved in these videodisc presentations was evaluated by using one-tailed dependent sample t-tests on the pretest-posttest gain scores for each test section (see Table 1, Combined Groups). Each of the three sections showed a significant difference in pretest-posttest mean score gain: Content, t(18) = 11.709, p < .001; Vocabulary, 4.129, p < .001;
Such high gains in the content area may reflect the fact that only 42 percent of the subjects had seen the movie before this study, thus depressing the pretest scores. But the significant gains in the vocabulary and idiomatic expressions sections, as well as in the content section, show that subjects indeed learned in these categories as a result of this experience.

In addition to gains in pretest-posttest means to determine the instructional effectiveness of the workstations, differences between groups on each test section were obtained to see whether the instructional processes associated with one group were more effective than the others. A concern of the first research question was obtaining information that would be helpful in deciding which processes are most effective. Independent sample t-tests were computed for each section of the test to determine whether one process of instruction made a significant difference in gain scores. It is clear from Table I that neither the content nor vocabulary test sections showed a significant difference between groups. Only in the idiomatic expressions section did the difference approach an acceptable level of significance, $t(17) = 1.695, p < .06$.

**Table 1**
Mean Gain Scores According to Group

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Content</th>
<th>Vocabulary</th>
<th>Idioms</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAVD</td>
<td>10</td>
<td>10.4</td>
<td>3.2</td>
<td>6.5</td>
</tr>
<tr>
<td>Non-IAVD</td>
<td>9</td>
<td>10.5</td>
<td>3.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Combined</td>
<td>19</td>
<td>10.5</td>
<td>3.2</td>
<td>5.5</td>
</tr>
</tbody>
</table>

In order to understand how subjects in each group made use of the available options, forced choice items concerning each option were included on the questionnaire. Subjects were asked to rate whether they used an option always, often, seldom, or never. Both groups reported using the printed script seldom. There were notable differences, however, between groups' use of the
dictionary and idiomatic expressions references. The IAVD group used the
dictionary and idiomatic expressions options often while the non-IAVD group used
their dictionary and idiomatic expressions reference book seldom. This may be
due to the ease of access which the IAVD group had to both references.

A major process difference between the groups was the ability to stop the
movie at will. The TAVD workstation had built-in stops at the end of each scene.
At each stop, it would automatically display the options available and the
questions pertinent to that scene. The non-IAVD workstation was under user
control. If the subject did not stop it, the movie would play continuously to the
end of the side of the videodisc. On the follow-up questionnaire, subjects were
asked whether they would prefer full user-control or have stops built into the
workstation. All the non-IAVD subjects and 85 percent of the IAVD subjects
reported a preference for full user-control.

The IAVD workstation had all the available options except for subject
control over stopping. The non-IAVD workstation did not have the dictionary
and idiomatic expression reference for each scene, though they were available in
book form in the workstation. Also, the non-IAVD workstation had no content or
"harder" content questions and answers. On the follow-up questionnaire, subjects
were asked if they would prefer having all options available to them, having the
same options that were part of their workstation, or having no options at all, that
is, seeing the movie as if at a theatre. All the non-IAVD subjects and 80 percent of
the IAVD subjects stated a preference for having all options available. All options
available would include the computer-generated questions and options, a
separate printed script to read while listening to the dialogue, and full user-
control over the videodisc.

Also, in the follow-up questionnaire IAVD subjects were asked to rate the
effectiveness of the content questions and answers option. On a scale of one to
two, five being most effective, the mean rating was 4.5, showing a very strong
preference for this option.

Finally, there was concern that because of all the available options and
accompanying directions in the IAVD workstation, the subjects might feel
inhibited by these complex directions. On the follow-up questionnaire subjects
were asked to rate how distracting the complex directions were. The use of the
equipment for the IAVD workstation subjects was somewhat complicated and
inhibiting during the first sessions. However, all IAVD subjects felt comfortable
using all the options after one or two sessions.
The second evaluation question deals with the costs of the project. The developers reported that the hardware costs for the IAVD workstation totaled close to four thousand dollars. While the software development costs were not available, a tentative price for the computer program is about three hundred dollars. The third evaluation question deals with implementation. One of the areas of concern was whether there would be any major breakdowns in either the hardware or the software during the project. This was a concern because of the newness of the technology involved. There were no major breakdowns during the study period in either the IAVD system or the non-IAVD system.

A concern of the fourth and fifth evaluation questions was that subjects would feel this lab experience had been effective. In the follow-up questionnaire, subjects were asked to compare on a scale of 1 to 5 the effectiveness of the IAVD labs to two other labs in which they frequently work. The other two include a computer-assisted instruction lab and an audiovisual listening lab. The IAVD subjects rated the IAVD lab as substantially more effective than both other labs, as shown in Table 2. The non-IAVD subjects rated the audiovisual lab slightly more effective. Another concern was subjects' perceptions of how motivating and stimulating the videodisc project was. In the follow-up questionnaire, subjects were asked to compare the motivation and stimulation of the videodisc project to the two other labs previously discussed.

**Table 2**
Rating of Labs According to Effectiveness and Motivation

<table>
<thead>
<tr>
<th>Labs</th>
<th>Effectiveness</th>
<th>Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IAVD</td>
<td>Non-IAVD</td>
</tr>
<tr>
<td>IAVD</td>
<td>4.4</td>
<td>---</td>
</tr>
<tr>
<td>Non-IAVD</td>
<td>---</td>
<td>3.9</td>
</tr>
<tr>
<td>Computer-assisted</td>
<td>3.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Audio-visual</td>
<td>3.6</td>
<td>4.0</td>
</tr>
</tbody>
</table>
As Table 2 indicates, the IAVD subjects rated the IAVD lab as much more motivating than both other labs. The non-IAVD subjects rated the videodisc project they were exposed to as substantially more motivating than the audiovisual lab, and also more motivating than the computer lab. These findings should be considered in light of the fact that the subjects were volunteers and that this was a "new" lab experience. While the concept of interacting with a computer and a movie at the same time is unique to them, they had experienced both computer-assisted instruction and videotape language labs before. The novelty of this experience, therefore, may not have been as significant as it would be for subjects with no audiovisual lab experience.

When asked on the questionnaire whether they would like to participate in this same type of lab experience again, all but one subject in each group responded affirmatively. Again, the fact that the participants were volunteers may have influenced their positive opinions about the workstations being effective and motivating.

One of the goals of the videodisc project was to provide instruction that would not intimidate students when they make a mistake. In the individual interviews held during the study, subjects responded that they were not embarrassed or intimidated when they were confused and had to ask for help, or made mistakes. The IAVD lab, while not found to be less embarrassing than the classroom, apparently does not present a more threatening or stressful atmosphere.

Summary
1. Costs and Implementation

Most of the costs of the IAVD workstation are in the purchase of hardware. The costs of the Sony microcomputer, the Pioneer videodisc player, and the high resolution color monitor together make up ninety-two percent of the equipment costs. The real cost savings over many new interactive videodisc projects is in the ability to use a commercially available videodisc instead of having to finance a video production.

The time and manpower necessary to create the instructional content of the lab may be roughly comparable to the development of any individualized, interactive instructional system. However, there are two advantages of the Annotate authoring system over traditional programming languages. First, it does not require a computer program to be written by the author (or a programmer) with programming expertise. The author is presented with a template into which the data are typed. Second, this inputting of data is done with a word processor, allowing considerable time savings over traditional authoring languages. The
template adds all the branching logic and builds the run program from the data files.

2. Instructional Process

The processes involved in these videodisc workstations have proven to be effective ways to bring the content, vocabulary, and idiomatic expressions to the comprehension of normative English-speaking subjects. Though the groups had no significant differences in their gain scores for content comprehension and vocabulary, there were notable differences in the processes involved. First, the non-IAVD workstation subjects had the ability to watch the entire side of the videodisc during each session, or to stop it at any point. This led to their tendency to linearly view the disc with very few interruptions. These subjects saw side two of the movie at a mean rate of 3.9 times, compared to the IAVD subjects’ mean of only 1.3 times. However, the non-IAVD subjects seldom used the dictionary and idiomatic expressions reference. The IAVD subjects used both the dictionary and idiomatic expressions reference nearly twice as often as the non-IAVD subjects.

It appears that a combination of the better points of the two labs would provide a more effective instructional experience. The options would include a printed script as well as a scene-by-scene script accessed as an option onto the screen. Also included would be the "harder questions" option, reportedly used nearly always by the IAVD subjects. The other options would be the same as contained in the IAVD workstation: the dictionary and idiomatic expressions options, the ability to repeat a scene or a previous scene, and the ability to skip scenes or questions.

When asked which combination of options would be best, the vast majority of subjects chose having all options from the IAVD workstation coupled with the ability to see the film without interruption or to stop it at their discretion. Whether this could be shown to be better empirically would require further study.

3. Intended Outcomes

An important outcome of the evaluation of these workstations was the affective reactions of the subjects to their experience. The findings that all but one subject in each group expressed a desire to participate in a similar experience shows that it was generally felt to be a worthwhile use of time. The IAVD subjects perceived this IAVD workstation experience to be more worthwhile than two of the other labs in which they are involved. Furthermore, the goal of providing instruction in an atmosphere that prevented intimidation or
embarrassment from mistakes was apparently achieved.

**Conclusion**

The development of the Raiders program stems from the idea that we can provide current, highly motivational and interesting material for ESL students to progress through at their own pace. The use of the motion picture medium itself provides inherent advantages in that it compels sustained attention, heightens reality, builds on a common denominator of experience, and offers a satisfying aesthetic experience (see Dale 1969:391-397). The use of the Annotate program allows for student individuality in deciding focus and sequence. Within certain limitations, the students control their own progress. The use of a popular videodisc such as Raiders provides unprecedented incentive and prior preparation on the part of the student, because many (if not most) students already will be acquainted with the content from having viewed the film with subtitles in their native language. This helps to lower the filter and set the stage for comprehensible input and a positive language acquisition experience.

Our observations and student reaction so far indicate that an interactive videodisc workstation is very promising and merits additional, long-term study. The students found the learning experience to be pleasant and free from anxiety. This is probably because the Raiders program, while highly interesting in content, allows for a prespeaking or listening phase along with limited required reading. Using only the receptive skill, the student does not feel threatened or intimidated.

Given the relatively low cost of equipment and the existence of professionally produced, high interest material available on videodisc, the possibility of exposing international students to authentic language in the appropriate cultural context is now a reality.

**References**


**Biodata**

Dwight Branvold was an elementary school teacher and counselor for eight years in Northern California. He received his B.S. in Elementary Education from Brigham Young University and his M.Ed. in Counseling and Guidance from the College of William and Mary in Virginia. Currently, he is a Ph.D.
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Glen W. Probst received his Ph.D. in Foreign Language Education at The Ohio State University in 1969. Since that time, he has been involved in teaching and administration at Michigan State University, Montana State University, Cassia County School District - Idaho; and for the past six years he has served as the Coordinator of the English Language Center at Brigham Young University, Provo, Utah.

Junius L. Bennion received his Ph.D. in Instructional Psychology at Brigham Young University in 1978. He was involved in interactive videodisc research and development at the McKay institute at BYU for seven years. Presently, he is continuing this work for the CALICO projects at BYU.

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